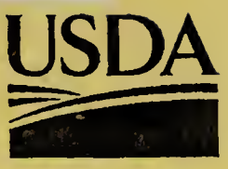

United States
Department of
Agriculture

Research, Education,
and Economics

Agricultural
Research
Service

Washington, D. C.

Agricultural Research Service FY 2003

Explanatory Notes

FY 2003 Explanatory Notes
Agricultural Research Service

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AGRICULTURAL RESEARCH SERVICE
Purpose Statement

The Agricultural Research Service (ARS) was established on November 2, 1953, pursuant to authority vested in the Secretary of Agriculture by 5 U.S.C. 301 and Reorganization Plan No. 2 of 1953, and other authorities.

The research performed by ARS is authorized by the Department of Agriculture Organic Act of 1862 (7 U.S.C. 2201, 2204), the Research and Marketing Act of 1946, amended (7 U.S.C. 427, 1621), the Food and Agriculture Act of 1977, as amended (7 U.S.C. 1281 note), the Food Security Act of 1985 (7 U.S.C. 3101 note), and the Food, Agriculture, Conservation, and Trade Act of 1990 (7 U.S.C. 1421 note), Federal Agriculture Improvement and Reform Act of 1996 (Fair Act) and the Agricultural Research, Extension, and Education Reform Act of 1998 (P.L. 105-185).

The mission of ARS research is to develop new knowledge and technology which will ensure an abundance of high quality agricultural commodities and products at reasonable prices to meet the increasing needs of an expanding economy and provide for continued improvement in the standard of living of all Americans. This mission focuses on the development of technical information and products which bear directly on the need to: (1) manage the Nation's soil, water, air and climatic resources, and improve the Nation's environment; (2) provide an adequate supply of agricultural products by practices that will maintain a permanent and effective agriculture; (3) improve the nutrition and well-being of the American people; (4) improve the quality of life in rural America; and (5) strengthen the Nation's balance of payments. The research applies to a wide range of goals; commodities; natural resources; fields of science; and geographic, climatic and environmental conditions.

As the Department of Agriculture's largest in-house research agency, ARS has major responsibilities for conducting and leading the national agricultural research effort. It provides:

* Research on broad regional and national problems
* Research to support Federal action and regulatory agencies
* Expertise to meet national emergencies
* Scientific resources to the Executive Branch and Congress

ARS is responsible for the following major program activities:

- Research to develop new knowledge to better manage and enhance the Nation's soil, water, and atmospheric resources to optimize agricultural productivity and environmental quality.
  Conserving and enhancing the Nation's soil, water, and air resources requires the development of guidelines for evaluating the impact of current practices and assessing the potential effects of changing practices on the quality and productive capacity of these resources. Research stresses the discovery and integration of knowledge into agricultural land management systems that can be used to maintain and enhance farm profitability, while reducing or reversing adverse impacts on long-term productivity and the environment. Management practices are being developed that will make better use of available water resources, enhance soil quality and reduce erosion, improve nutrient use efficiency, and provide an optimum environment for crop growth. The impacts of air quality on agricultural production and the effect of agricultural practices on air quality and sustainability of agricultural systems are evaluated. In addition, the effects of global change on the natural resources and the appropriate response measures are researched.

- Research to expand the knowledge and technology base necessary to maintain and increase the productivity and quality of crop plants.
  Emphasis is placed on improving the efficiency of crop production and the quality of market products to meet processor and consumer needs, and maintaining and improving the competitiveness of U.S. agricultural products in domestic and world markets. Research is conducted on a broad range of crops including grains, oilseeds, sugar crops, fruits, vegetables, ornamentals, forage, range, and industrial crops.

The National Plant Germplasm System provides the foundation for genetic improvement and encompasses the acquisition, preservation, evaluation, and enhancement activities necessary to properly utilize plant germplasm. Biologically-based technologies are being used in integrated pest management systems to protect plants from diseases, insects, and weeds, thereby reducing dependence on agricultural chemicals. Special emphasis is placed on sustainable agricultural production systems that are effective, profitable, and protective of soil, air, and water resources.

- Research to provide new knowledge and technology to maintain and increase productivity and quality of animals and animal products.

  Primary emphasis is placed on improving the efficiency of livestock, poultry, and aquaculture production while simultaneously improving the quality of the end product. The total effort is designed to solve both short- and long-term, high priority national problems and to address the needs of action and regulatory agencies. Major thrusts include improving the productivity of animals; assuring the quality and safety of animal products used as food for humans; and reducing losses due to pathogens, diseases, parasites, and insect pests. To accomplish these goals, new technological innovations are needed to preserve and effectively utilize animal germplasm; understand how specific genes improve production, reproduction, and animal product quality; enhance genetic resistance to diseases; improve techniques to rapidly diagnose, prevent, manage, or eliminate diseases, parasites, and insect pests; and detect and control microbial and chemical residue contamination in live animals and animal products. Research is currently underway to more rapidly change the genetic makeup of animals and improve their reproductive efficiency and growth potential; improve the nutritional components of animal feedstuffs; genetically reduce lipids in animal products; develop genetically engineered vaccines for protection against pathogens, diseases, parasites, and insect pests; and develop new, rapid, and accurate methods of disease diagnosis. Also, research is being conducted to improve the safety of animal food products; develop integrated management technologies for insect pests and disease vectors; improve the well-being and humane care of farm animals in production facilities; and develop the means to manage and utilize animal wastes to reduce contamination of surface and groundwater.

- Research to develop and expand technologies necessary to achieve maximum use of agricultural commodities in domestic and world markets.

  Increasing the economic viability of rural communities and competitiveness of U.S. agriculture by enhancing the quality, assuring the safety, and increasing the use of agricultural materials in products for domestic and global markets is essential to developing postharvest research strategies.

  Food Safety--Reduction of potential risks for consumers caused by pathogens in food is a core focus of ARS' food safety program. Much of this research is devoted to all aspects of preharvest and postharvest pathogen reduction. Lowering risks from naturally occurring toxicants, mycotoxins, and chemical residues in the food supply is the other major thrust of food safety research. These activities lead to reduced health risks for consumers, and enhanced economic opportunities for farmers and processors.

  Commodity Quality-- Maintaining the quality of U.S. commodities is a key factor to increasing domestic and foreign market demand. Technologies to assess and maintain the important physical, sanitary, and performance characteristics of agricultural commodities are essential to enhanced economic opportunities and global competitiveness.

  Trade and Quarantine Barriers--Processes to eliminate or control postharvest insects and spoilage organisms are crucial to enhance economic opportunities for U.S. commodities by overcoming regulatory and quarantine trade barriers. Emphasis is on the development of acceptable treatment technologies for agricultural commodities that meet regulatory and quarantine requirements. This enhances global competitiveness and economic opportunities for the U.S. agricultural system, while protecting the environment by devising alternatives to the use of ozone depleting fumigants such as methyl bromide.

New Uses and Process Improvement--The program has three segments: (1) development of new products and processes based on vegetable oils, animal fats, oilseed and grain proteins, carbohydrates (starch), and established fibers (cotton and leather); (2) finding uses for new crops not now grown on a significant scale in the U.S. (guayule, jojoba, lesquerella, kenaf, flax); and (3) producing biofuels, principally ethanol made from high starch crops and biodiesel made from vegetable oil (soybean) and animal fats. The focus of this research is lower cost processing technologies and creation of new products from agricultural crops to meet domestic and global demands, thus expanding U.S. economic opportunities and enhancing global competitiveness.

- Research to develop new technology essential to improve human health and well-being through improved nutrition.
  USDA has the primary responsibility for developing fundamental information on human nutrition requirements which provides the basis for development of dietary guidelines and food assistance programs. As the Federal government's lead agency for human nutrition research, ARS activities are directed toward understanding the effects of diet by using healthy human volunteers of all ages. The objectives of the research are to improve human health by defining nutrient requirements to enable robust physical and mental functions and increase resistance to disease and slow the aging degeneration. The research includes determination of food consumption patterns, development of nutritional status assessment technologies, assessment of nutrient composition of foods, and maintenance of the national Nutrient Database, a compendium in printed and electronic form of the information. Research on strategies to effect public acceptance of change in dietary habits focuses on regional influences in the Lower Mississippi Delta. The knowledge derived from these activities provides multiple benefits to the Nation, in the form of a healthy population, reduced health care costs, longer active life spans, cost-effective food assistance, and improved life.

- Integrate knowledge of agricultural production, processing, and marketing into management systems which optimize utilization of users' resources and net returns.
  Finding solutions to important national problems faced by agriculture requires the integration of components of research from all areas of the agricultural and natural resource system. These components include soils, water, climate, plants, animals, insects, diseases, weeds, and people. This research evaluates the interaction of many components that constitute a system including an agroecosystem, a watershed, or a farm. Systems research integrates results into products that aid or improve the timeliness and pertinence of decisions made by managers of agricultural systems. Discovery and understanding of critical gaps in knowledge that can be integrated from ongoing component research into further refinements of systems is a critical aspect of these efforts. Systems research leads to reduced input costs, higher returns, improved product quality, more efficient resource use, reduced environmental impact, and improved sustainability of agricultural production systems that meet long-term societal needs. The research requires multi-disciplinary efforts which is often located at various sites throughout the United States. Team members are linked through national information networks to share concepts and databases required to build and evaluate models. Mathematical models are one of several techniques used to describe real systems. Experiments are performed to understand responses over time to alternative environments or management practices. Decision support systems can be devised that integrate available knowledge, simulation models, records of personal experience and observations, and error analysis that permit a manager to compare and evaluate management options.

- Identify, acquire, organize, preserve, and disseminate pertinent food and agricultural information.
  Overall, the thrust of the National Agricultural Library (NAL) activities is to utilize computer and electronic technologies to provide access to scientific and agricultural information, irrespective of where it resides, to USDA, public organizations, and individuals. To this end, NAL is addressing within its strategic plan how it will provide global leadership in identifying and implementing new methods, techniques, and technologies for improving access to and management of agricultural information.

NAL activities continue to rely heavily on incorporation of electronic technologies. Many of the new information technologies have been embraced and, as a result, many individuals within the agricultural community look to NAL to lead agricultural libraries into the electronic age. Support of the Electronic Information Initiative and Digital Preservation of older materials, has aided in moving into the electronic information age.

In addition, ARS appropriated funds are expended in support of:

- Repair and maintenance of facilities. Funds are used to repair and maintain ARS facilities to provide safe, energy efficient and functional workspace for in-house research. The Agency is committed to adequately funding routine maintenance and repair to assure that all facilities are properly maintained. Each location also allocates a minimum of 4 percent of program funds to perform the most urgent repairs or maintenance of facilities.

The Department has a central fund to promote facility compliance under requirements of the Comprehensive Environmental Response, Compensation, and Liability Act and the Resource Conservation Recovery Act. These Acts require Federal agencies to meet the same standards for storage and disposition of hazardous wastes as do private businesses. The funds provided for this program enable the Department to address problems caused by past uncontrolled hazardous waste disposal practices and to deal with the regulation of current hazardous substances. Resources are allotted to USDA agencies from the central fund. The Agency supplements these funds as necessary.

ARS' Headquarters offices are located in the Washington, D.C. metropolitan area. Field activities are managed on a national basis through eight Area Offices. Research is conducted at field locations in the United States, District of Columbia, Puerto Rico, the Virgin Islands, and several foreign countries. Much of the work is conducted in direct cooperation with State agricultural experiment stations, other State and Federal agencies, and private organizations. ARS programs are organized and managed at the national level under 22 national program areas.

As of September 30, 2001, there were 6,689 full-time employees and 1,961other than full-time employees. Of the total, 512 full-time employees and 32 other than full-time employees worked in offices located in the Washington, D.C. metropolitan area.

During FY 2001 the following GAO and OIG reports were completed:

GAO Report: "Federal Procurement: Better Guidance and Monitoring Needed to Assess Purchases of Environmentally Friendly Products," GAO-01-430, published June 22, 2001.

GAO Report: "International Trade: Concerns Over Biotechnology Challenge to U.S. Agricultural Exports," GAO-01-727, published June 15, 2001.

GAO Report: "Invasive Species: Obstacles Hinder Federal Rapid Response to Growing Threat," GAO-01-724, published July 24, 2001.

GAO Report: "Agricultural Pesticides: Management and Improvements Needed to Further Promote Integrated Pest Management," GAO-01-815, published August 17, 2001.

GAO Report: "Bioterrorism: Federal Research and Preparedness Activities," GAO-01-915, published September 28, 2001.

GAO Report: "Combating Terrorism: Selected Challenges and Related Recommendations," GAO-01-822, published September 20, 2001.

OIG Report: "Bionetics Corp. Incurred Cost Audits for Fiscal Year 1997 and 1998," 02-017-0017-HY, released April 18, 2001.

The following GAO and OIG reports are in progress:

GAO Review: "Rightsizing the U.S. Embassy in Paris, France."

GAO Review: "Issues Regarding the Safety of Genetically Modified Food Products."

GAO Review: "Federal Programs and Policies Affecting Fruit and Vegetable Consumption."

OIG Review: "IT Security at the Agricultural Research Service."

OIG Review: "Management of Hazardous Materials Management Funds," Discussion Draft No. 50801-12-AT.

AGRICULTURAL RESEARCH SERVICE

Available Funds and Staff Years
2001 Actual and Estimated 2002 and 2003

Item	2001 Actual		2002 Estimated		2003 Estimated	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Salaries and Expenses	$916,312,000	7,424	979,464,000	8,008	$968,638,000	7,960
Rescission	-1,977,386	--	--	--	--	--
Miscellaneous Fees	1,068,824	--	--	--	--	--
Transfer/Rental Payments GSA	2,699,000	--	2,807,000		2,807,000	--
Pension & Annuitant Health Benefits	34,024,000	--	38,124,000	--	42,641,000	--
Transfer from Office of Congressional Relations	128,716	--	--	--	--	--
Transfer from Agency for Int'l Development (AID)	12,975,495	--	--	--	--	--
Subtotal, S & E Discretionary	965,230,649	7,424	1,020,395,000	8,008	1,014,086,000	7,960
Homeland Security Supplemental S & E	--	--	40,000,000	--	--	--
Subtotal, Agricultural Research Service	965,230,649	7,424	1,060,395,000	8,008	1,014,086,000	7,960
Buildings & Facilities	74,200,000	--	118,987,000	--	16,580,000	--
Rescission	-163,240	--	--	--	--	--
Subtotal, Buildings & Facilities	74,036,760	--	118,987,000	--	16,580,000	--
Homeland Security Supplemental B & F	--	--	73,000,000	--	--	--
Total Buildings & Facilities	74,036,760	--	191,987,000	--	16,580,000	--
Total, Agricultural Research Service	1,039,267,409	7,424	1,252,382,000	8,008	1,030,666,000	7,960
Allocations from:						
Hazardous Waste Management	3,333,168	--	3,250,000	--	3,000,000	--
Obligations under other USDA appropriations:						
Agricultural Marketing Service	352,996	3	388,000	3	388,000	3
Animal and Plant Health Inspection Service	8,882,009	78	9,770,000	78	9,770,000	78
Cooperative State Research, Education, and Extension Service	5,805,944	51	6,387,000	51	6,387,000	51
Departmental Administration (HACU)	1,688,355	15	1;857,000	15	1,857,000	15
Economic Research Service	3,603,214	31	3,964,000	31	3,964,000	31
Farm Service Agency	603,156	6	663,000	6	663,000	6

Available Funds and Staff Years
2001 Actual and Estimated 2002 and 2003

Item	2001 Actual		2002 Estimated		2003 Estimated	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Other USDA Funds (continued)						
Food and Nutrition Service	853,715	8	939,000	8	939,000	8
Food Safety and Inspection Service	1,901,050	18	2,091,000	18	2,091,000	18
Foreign Agricultural Service	1,045,368	10	1,150,000	10	1,150,000	10
Forest Service	746,408	7	821,000	7	821,000	7
Grain Inspection, Packers and Stockyards Administration	113,967	1	125,000	1	125,000	1
National Agricultural Statistics Service	4,160,401	37	4,576,000	37	4,576,000	37
Office of Risk Assessment and Cost Benefit Analyses	69,605	1	76,000	1	76,000	1
Natural Resources Conservation Service	521,232	5	573,000	5	573,000	5
Quarters and Subsistence	146,922	--	162,000	--	162,000	--
Risk Management Agency	18,621	--	20,000	--	20,000	--
Rural Development Administration	29,771	--	33,000	--	33,000	--
Sale of Animals and Personal Property (Proceeds)	820,125	--	902,000	--	902,000	--
Misc., Reimbursements	381,146	--	7,486,000	--	7,486,000	--
Total, Other USDA Appropriations	31,744,005	271	41,983,000	271	41,983,000	271
Total, Agriculture Appropriations	1,074,344,582	7,695	1,297,615,000	8,279	1,075,649,000	8,231
Other Federal Funds:						
Department of Defense	2,208,432	22	2,429,000	22	2,429,000	22
Department of Energy	1,288,461	11	1,417,000	11	1,417,000	11
Department of Health and Human Services	3,791,451	34	4,171,000	34	4,171,000	34
Department of the Interior	967,762	9	1,065,000	9	1,065,000	9
Department of Justice	52,436	--	58,000	--	58,000	--
Environmental Protection Agency	669,669	6	737,000	6	737,000	6
Federal Emergency Management Agency	52,926	--	58,000	--	58,000	--
General Services Administration	21,588	--	24,000	--	24,000	--
National Aeronautics and Space Administration	925,007	9	1,018,000	9	1,018,000	9

Available Funds and Staff Years
2001 Actual and Estimated 2002 and 2003

Item	2001 Actual		2002 Estimated		2003 Estimated	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Other Federal Funds: (continued)						
Nuclear Regulatory Commission	60,673	--	67,000	--	67,000	--
Misc., Other Federal Funds	-860,565	--	1,096,000	--	1,096,000	--
Non-Federal Funds:						
Arizona, University of	231,786	2	255,000	2	255,000	2
Arkansas, University of	53,507	1	59,000	1	59,000	1
Baltimore Research & Education Foundation	45,818	--	50,000	--	50,000	--
Binational Agricultural Research and Development Agreement (BARD)	423,417	4	466,000	4	466,000	4
Biotechnology Research and Development Corporation (BRDC)	16,585	--	18,000	--	18,000	--
California, State of	830,221	7	913,000	7	913,000	7
California, University of	169,411	1	186,000	1	186,000	1
Clemson University	22,265	--	24,000	--	24,000	--
Colorado, State of	31,358	--	34,000	--	34,000	--
Colorado State University	26,318	--	29,000	--	29,000	--
Cotton Foundation	10,021	--	11,000	--	11,000	--
Cotton Incorporated	384,703	3	423,000	3	423,000	3
Florida, State of	69,440	1	76,000	1	76,000	1
Florida, University of	28,812	--	32,000	--	32,000	--
Delaware, State of	17,675	--	19,000	--	19,000	--
Delaware, University of	31,186	--	34,000	--	34,000	--
Environmental Health Watch	13,457	--	15,000	--	15,000	--
Georgia, State of	14,246	--	16,000	--	16,000	--
Georgia, University of	74,814	1	82,000	1	82,000	1
Iowa State University	132,649	1	146,000	1	146,000	1
Los Alamos National Laboratory	52,311	1	58,000	1	58,000	1
Maryland, University of	134,404	1	148,000	1	148,000	1
Minnesota, University of	133,873	1	147,000	1	147,000	1
National Institute of Alcohol Alcohol Abuse	20,296	--	22,000	--	22,000	--
National Pork Producers Council	11,628	--	13,000	--	13,000	--
National Space Development Agency of Japan	33,075	--	36,000	--	36,000	--
Nebraska, University of	51,642	1	57,000	1	57,000	1
New Mexico State University	13,656	--	15,000	--	15,000	--

Available Funds and Staff Years
2001 Actual and Estimated 2002 and 2003

Item	2001 Actual		2002 Estimated		2003 Estimated	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Non-Federal Funds: (continued)						
North Carolina State University	35,804	--	39,000	--	39,000	--
Office of National Drug Control	31,086	--	34,000	--	34,000	--
Ohio State University	15,665	--	17,000	--	17,000	--
Oklahoma State University	43,883	--	48,000	--	48,000	--
Oregon State University	36,767	--	40,000	--	40,000	--
Pennsylvania State University	76,623	1	84,000	1	84,000	1
South Carolina Foundation Seed Association	27,709	--	30,000	--	30,000	--
Southern Florida Water Management District	67,410	1	74,000	1	74,000	1
Southern Region Sustainable Agriculture Research & Education	143,822	1	158,000	1	158,000	1
Southwest Water Consortium	12,160	--	13,000	--	13,000	--
Tarleton State University	45,231	--	50,000	--	50,000	--
Tennessee, University of	25,529	--	28,000	--	28,000	--
Texas A&M University Agricultural Experimental Station	52,164	1	57,000	1	57,000	1
Texas, State of	83,826	1	92,000	1	92,000	1
Texas Tech University	39,187	--	43,000	--	43,000	--
Tulsa, City of	84,002	1	92,000	1	92,000	1
Unilever Research	29,348	--	32,000	--	32,000	--
United Soybean Board	62,655	1	69,000	1	69,000	1
Utah State University	85,109	1	94,000	1	94,000	1
Washington State University	170,889	1	188,000	1	188,000	1
Washington Tree Fruit Commission	38,563	--	42,000	--	42,000	--
Water Environment Research Foundation	30,203	--	33,000	--	33,000	--
Watershed Agricultural Council of the New York City	9,423	--	10,000	--	10,000	--
Misc., Non-Federal Funds	123,664	--	1,126,000	--	1,126,000	--
Miscellaneous Contributed Funds:	24,481,944	114	28,000,000	114	32,000,000	114
Total, Agricultural Research Service	$1,112,453,662	7,934	$1,343,631,996	8,518	$1,125,665,996	8,470

AGRICULTURAL RESEARCH SERVICE

Permanent Positions by Grade and Staff Year Summary
2001 Actual and Estimated 2002 and 2003

Grade	2001			2002			2003		
	Head-quarters	Field	Total	Head-quarters	Field	Total	Head-quarters	Field	Total
ES-6	2	1	3	2	1	3	2	1	3
ES-5	1	1	2	1	2	3	1	2	3
ES-4	3	6	9	3	7	10	3	7	10
ES-3	3	11	14	3	11	14	3	11	14
ES-2	2	3	5	2	5	7	2	5	7
ES-1	1	4	5	1	3	4	1	3	4
GS/GM-15	49	493	542	49	476	525	49	476	525
GS/GM-14	46	542	588	46	554	600	46	554	600
GS/GM-13	104	620	724	104	716	820	104	716	820
GS-12	107	681	788	107	790	897	106	791	897
GS-11	23	562	585	23	639	662	23	639	662
GS-10	1	9	10	1	15	16	1	15	16
GS-9	32	858	890	32	974	1,006	30	976	1,006
GS-8	19	363	382	19	349	368	18	350	368
GS-7	54	676	730	54	778	832	50	782	832
GS-6	41	514	555	41	597	638	38	600	638
GS-5	21	363	384	21	422	443	18	425	443
GS-4	9	82	91	9	91	100	9	91	100
GS-3	2	26	28	2	31	33	2	31	33
GS-2	1	12	13	1	20	21	1	20	21
GS-1	0	0	0	0	3	3	0	3	3
Other Graded Positions.....	5	50	55	5	51	56	5	51	56
Ungraded Positions.....	0	520	520	0	519	519	0	519	519
Total Permanent Positions.....	526	6,397	6,923	526	7,054	7,580	512	7,068	7,580
Unfilled Positions end-of-year.....	-8	-226	-234	-8	-243	-251	-22	-229	-251
Total Permanent Full-Time Employment, end-of-year.....	518	6,171	6,689	518	6,811	7,329	490	6,839	7,329
Staff Year Estimate.....	514	7,420	7,934	514	8,004	8,518	486	7,984	8,470

AGRICULTURAL RESEARCH SERVICE

Classification by objects
2001 Actual and Estimated 2002 and 2003
(Dollars in thousands)

		2001	2002	2003
Personnel Compensation:				
	Headquarters	$71,271	$73,650	$75,370
	Field	330,163	373,460	386,925
11	Total personnel compensation	401,434	447,110	462,295
12	Personnel benefits	131,610	145,430	153,794
13	Benefits for former employees	278	--	--
	Total pers. comp. & benefits	533,322	592,540	616,089
Other Objects:				
21	Travel	15,930	20,200	18,491
22	Transportation of things	1,299	1,400	1,377
23.1	Rent paid to GSA	2,699	2,807	2,807
23.2	Rent paid to others	808	1,900	883
23.3	Communications, utilities and misc. charges	35,583	38,500	35,922
24	Printing and reproduction	1,379	1,500	1,473
25.1	Advisory and assistance services	995	1,000	1,000
25.2	Other services	57,065	114,455	72,368
25.3	Purchases of goods and services from Government Accounts	3,170	5,200	3,155
25.4	Operation and maintenance of facilities	22,757	30,200	23,810
25.5	Research and development contracts	132,278	144,500	111,146
25.6	Medical care	167	200	190
25.7	Operation and maintenance of equipment	6,716	6,800	6,701
25.8	Subsistence and support of persons	1,116	1,200	1,141
26	Supplies and materials	90,836	95,400	92,952
31	Equipment	47,237	63,300	49,489
32	Land and structures	14,414	46,980	32,592
41	Grants, subsidies, and contributions	47,592	26,500	24,500
	Total other objects	482,041	602,042	479,997
	Total direct obligations	1,015,363	1,194,582	1,096,086
Position Data:				
	Average Salary, ES positions	$131,367	$137,633	$142,588
	Average Salary, GS positions	$48,440	$50,755	$52,582
	Average Grade, GS positions	10.0	10.0	10.0
	Average Salary of Ungraded positions	$5,889	$6,170	$6,392

Note: Includes Salaries and Expenses and Buildings and Facilities Obligations.
Excludes reimbursable obligations.

AGRICULTURAL RESEARCH SERVICE

PASSENGER MOTOR VEHICLES AND AIRCRAFT

The Agricultural Research Service (ARS) passenger motor vehicle fleet is used primarily by professional research investigators and technical personnel. In the course of their daily work, research personnel travel to individual farms, ranches, commercial firms, State agricultural experiment stations, research fields, etc. Since a high degree of mobility is necessary in this type of work, using common carriers is not feasible. Comparative studies of cost requirements involved when using private and Government vehicles show that it is more economical to have Government vehicles available than it is for reimbursement for using privately-owned vehicles.

It is ARS' policy to pool motor vehicle use for different activities in order to keep the number of vehicles to a minimum and reduce the overall operation and maintenance costs. The agency requires quarterly vehicle operational reports and makes periodic surveys to determine the extent that vehicles are being used and their condition.

Replacement of passenger motor vehicles. ARS proposes replacing 46 of the 377 passenger vehicles currently in operation. These vehicles are assigned throughout ARS locations nation-wide and are used in conjunction with research studies and technical assistance. Vehicle replacement is based on funding priority, program management, vehicle mileage, and vehicle age. Federal regulations establish the minimum replacement standards that allow Agencies to replace passenger vehicles when the vehicle is 3 years of age or has 60,000 miles. However, agencies can retain vehicles that meet the minimum replacement standards if the vehicle can be operated without excessive maintenance costs or substantial reduction in resale value. All vehicles proposed for replacement have a mileage of more than 60,000.

Age and mileage data for passenger motor vehicles on hand as of September 30, 2001 are as follows:

Age Data			Mileage Data		
Age-Year Model	Number of Vehicles	Percent of Total	Lifetime Mileage (thousands)	Number of Vehicles	Percent of Total
1996	218	57	Over 100	10	3
1997	35	10	80-100	19	5
1998	31	8	60-80	111	30
1999	32	9	40-60	64	17
2000	30	8	20-40	52	14
2001	31	8	Under 20	121	31
Total	377	100	Total	377	100

AIRCRAFT

ARS currently maintains a fleet of six aircraft which are located at College Station and Weslaco, Texas. These aircraft have been specially modified and equipped for research for pest control methods, application of agricultural materials, radar tracking of airborne insect migration, infrared and color photography, and evaluating effects of weather on agriculture.

There are no planned replacements for these aircraft.

AGRICULTURAL RESEARCH SERVICE

Proposed Language Changes

The estimates include appropriation language for this item as follows (new language underscored; deleted matter enclosed in brackets):

Salaries and Expenses:

For necessary expenses to enable the Agricultural Research Service to perform agricultural research and demonstration relating to production, utilization, marketing, and distribution (not otherwise provided for); home economics or nutrition and consumer use including the acquisition, preservation, and dissemination of agricultural information; and for acquisition of lands by donation, exchange, or purchase at a nominal cost not to exceed $100, and for land exchanges where the lands exchanged shall be of equal value or shall be equalized by a payment of money to the grantor which shall not exceed 25 percent of the total value of the land or interests transferred out of Federal ownership, [$979,464,000] $1,014,086,000: Provided, That appropriations hereunder shall be available for temporary employment pursuant to the second sentence of section 706(a) of the Organic Act of 1944 (7 U.S.C. 2225), and not to exceed $115,000 shall be available for employment under 5 U.S.C. 3109: Provided further, That appropriations hereunder shall be available for the operation and maintenance of aircraft and the purchase of not to exceed one for replacement only: Provided further, That appropriations hereunder shall be available pursuant to 7 U.S.C. 2250 for the construction, alteration, and repair of buildings and improvements, but unless otherwise provided, the cost of constructing any one building shall not exceed $375,000, except for headhouses or greenhouses which shall each be limited to $1,200,000, and except for 10 buildings to be constructed or improved at a cost not to exceed $750,000 each, and the cost of altering any one building during the fiscal year shall not exceed 10 percent of the current replacement value of the building or $375,000, whichever is greater: Provided further, That the limitations on alterations contained in this Act shall not apply to modernization or replacement of existing facilities at Beltsville, Maryland: Provided further, That appropriations hereunder shall be available for granting easements at the Beltsville Agricultural Research Center, including an easement to the University of Maryland to construct the Transgenic Animal Facility which upon completion shall be accepted by the Secretary as a gift: Provided further, That the foregoing limitations shall not apply to replacement of buildings needed to carry out the Act of April 24, 1948 (21 U.S.C. 113a): Provided further, That funds may be received from any State, other political subdivision, organization, or individual for the purpose of establishing or operating any research facility or research project of the Agricultural Research Service, as authorized by law.

None of the funds in the foregoing paragraph shall be available to carry out research related to the production, processing or marketing of tobacco or tobacco products.

In fiscal year [2002] 2003, the agency is authorized to charge fees, commensurate with the fair market value, for any permit, easement, lease, or other special use authorization for the occupancy or use of land and facilities (including land and facilities at the Beltsville Agricultural Research Center) issued by the agency, as authorized by law, and such fees shall be credited to this account, and shall remain available until expended for authorized purposes.

[For emergency expenses to respond to the September 11, 2001, terrorist attacks on the United States, for "Salaries and Expenses", $40,000,000, to remain available until expended, to be obligated from amounts made available in Public Law 107-38.]

AGRICULTURAL RESEARCH SERVICE

Lead-Off Tabular Statement

SALARIES AND EXPENSES - CURRENT LAW

Appropriations Act, 2002		$979,464,000 a/
Budget Estimate, 2003		1,014,086,000
Increase in Appropriation		+34,622,000
Adjustments in 2002:		
Appropriations Act, 2002	$979,464,000	
Transfer in Estimates for Retirement/ Health Pension Benefits b/	38,124,000	
Activities transferred from Rental Payments to GSA account c/	2,807,000	
Adjusted base for 2002		$1,020,395,000
Budget Estimate, Current Law, 2003		1,014,086,000
Decrease under adjusted 2002		-6,309,000

a/ This amount excludes $128,716 transferred from Congressional Relations and $40 million Supplemental Funds from Emergency Response Fund.

b/ Estimates for Retirement/Health Benefits are included in the budgets of agencies as a one-time shift of funds. On a comparable basis the full annual cost of the activity is $42,641,000 for 2003.

c/ Rental Payments to GSA are included in the budgets of agencies occupying GSA space as a one-time shift of funds. On a comparable basis the full annual cost of the activity is $3,709,400 for 2003.

AGRICULTURAL RESEARCH SERVICE

SUMMARY OF INCREASES AND DECREASES
(On basis of appropriation)

Item of Change	2002 Estimated	Pay Costs	Program Changes	2003 Estimated
Research on Soil, Water, and Air Sciences	$103,291,000	+$4,045,000	-$122,000	$107,214,000
Research on Plant Sciences	385,908,000	+14,377,000	-35,565,000	364,720,000
Research on Animal Sciences	192,742,000	+6,982,000	-3,260,000	196,464,000
Research on Commodity Conversion and Delivery	182,425,000	+7,142,000	-3,588,000	185,979,000
Human Nutrition Research	77,775,000	+1,258,000	-923,000	78,110,000
Integration of Agricultural Systems	39,285,000	+884,000	+113,000	40,282,000
Agricultural Information and Library Services	20,747,000	+681,000	+1,667,000	23,095,000
Repair and Maintenance of Facilities	18,222,000	–	–	18,222,000
Total Available	1,020,395,000	+35,369,000	-41,678,000	1,014,086,000

AGRICULTURAL RESEARCH SERVICE

Project Statement - Current Law
(On basis of appropriation)

	2001 Actual		2002 Estimated		Increase or Decrease	2003 Estimated	
	Amount	Staff Years	Amount	Staff Years		Amount	Staff Years
1. Research on Soil, Water and Air Sciences	$101,991,225	922	$103,291,000	973	+$3,923,000 (1)	$107,214,000	988
2. Research on Plant Sciences	338,740,651	3,169	385,908,000	3,460	-21,188,000 (2)	364,720,000	3,372
3. Research on Animal Sciences	175,511,658	1,647	192,742,000	1,778	+3,722,000 (3)	196,464,000	1,801
4. Research on Commodity Conversion & Delivery	178,809,664	1,539	182,425,000	1,642	+3,554,000 (4)	185,979,000	1,641
5. Human Nutrition	78,611,366	297	77,775,000	300	+335,000 (5)	78,110,000	297
6. Integration of Ag. Systems	35,274,718	205	39,285,000	205	+997,000 (6)	40,282,000	205
7. Agricultural Information and Library Services	21,422,329	155	20,747,000	160	+2,348,000 (7)	23,095,000	166
8. Repair and Maintenance of Facilities	18,144,152	--	18,222,000	--	--	18,222,000	--
9. Collaborative Research Program (AID)	10,494,027 a/	--	--	--	--	--	--
10. Miscellaneous Fees	362,431	--	--	--	--	--	--
11. Unobligated balance	5,868,428 b/	--	--	--	--	--	--
Total, Available or Estimate	965,230,649	7,934	1,020,395,000	8,518	-6,309,000	1,014,086,000	8,470
Agricultural Risk Protection Act funding for Ethanol/Waste	-17,500,000	--	--	--			
Transfer from Office of Congressional Relations	-128,716	--	--	--			
Transfer from Agency for Int'l. Development (AID)	-12,975,495 c/	--	--	--			
Transfer from Rental Payments to GSA	-2,699,000	--	-2,807,000	--			
Retirement/Health Pension Benefits	-34,024,000	--	-38,124,000	--			
Miscellaneous Fees	-1,068,824 d/	--	--	--			
FY 2001 Rescission	1,977,386		--	--			
Total Appropriations	898,812,000	7,934	979,464,000	8,518			

a/ Collaborative Research Program Funds from AID are designated as no-year funds. This amount includes $4,990,928 carried forward from FY 2000 funds but obligated in FY 2001 and $5,503,099 in FY 2001 funds.

b/ Unobligated balance includes $2,680,567 in ARS direct funds; $2,481,468 from FY 2001 Collaborative Research Program Funds available in FY 2002 and $706,393 Miscellaneous Fees available in FY 2002.

c/ Includes $10,494,027 Collab. Research Program Funds obligated in FY 2001 and $2,481,468 available in FY 2002.

d/ Includes $362,431 Miscellaneous Fees obligated in FY 2001 and $706,393 available in FY 2002.

Agricultural Research Service: FY 2003 Proposed Budget Increases by ARS Objective

New Areas of Emphasis	Soil, Water, & Air Sciences	Plant Sciences	Animal Sciences	Commodity Conversion & Delivery	Human Nutrition	Integration of Agricultural Systems	Information & Library	Total Increase
• Counter-Terrorism		500,000	4,500,000					5,000,000
• Emerging, Reemerging, and Exotic Diseases of Plants/Animals		5,357,000	8,000,000					13,357,000
• Agricultural Genomes		2,950,000	3,950,000					6,900,000
• Biotechnology Risk Assessment		3,600,000						3,600,000
• Control of Invasive Species		2,700,000						2,700,000
• Agricultural Genetic Resources		4,000,000						4,000,000
• Managing Wastes to Enhance Air and Water Quality	5,000,000							5,000,000
• Biobased Products & Bioenergy from Agricultural Commodities				9,000,000				9,000,000
• Agricultural Information Services							2,000,000	2,000,000
• Global Climate Change	6,500,000							6,500,000
Total	11,500,000	19,107,000	16,450,000	9,000,000	0	0	2,000,000	$58,057,000

Note: Increased pay costs are not included in the table.

AGRICULTURAL RESEARCH SERVICE

JUSTIFICATION OF INCREASES AND DECREASES–PROGRAMS

OBJECTIVE 1: SOIL, WATER, AND AIR SCIENCES

1) An increase of $3,923,000 for research on Soil, Water, and Air Sciences consisting of:

a) An increase of $4,045,000 which includes an increase of $2,147,000 for restoration of FY 2002 pay costs, and an increase of $1,898,000 which includes $1,235,000 for the annualization of the FY 2003 pay raise and $663,000 for the anticipated FY 2003 pay raise.

ARS proposes an increase of $4,045,000 for pay costs in FY 2003. While increased appropriations proposed in the President's FY 2002 Budget for pay were agreed to by the House and Senate, final Conference action dropped this essential funding. The Agency is requesting that pay costs effective in FY 2002 be restored. In addition, the President's Budget recommends funding for proposed pay costs that are anticipated in FY 2003.

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these costs reduces the number of scientists and support personnel and operating funds essential to maintain and conduct viable research programs. If funds for increased pay costs are not provided, ARS will be unable to fill some essential positions, and will have to reduce spending in all non-pay areas including laboratory equipment and supplies needed to carry out the Agency's research programs.

b) An increase of $5,000,000 for research in support of Managing Wastes to Enhance Air and Water Quality.

Explanation of Change.

Livestock and poultry production in the United States has become increasingly concentrated in confinement facilities often located on small land areas. Manure generated at approximately 280,000 animal feeding operations around the country can be used as a nutrient source for crops, to improve soil properties, and for alternative uses such as energy production. However, improperly managed manure poses a threat to soil, water, and air quality, and to human and animal health. The main problems associated with manure management are: nutrient enrichment of soil and water; atmospheric emission of odor causing compounds, ammonia, and greenhouse gases; and pathogens and pharmaceutically active chemicals such as antibiotics that may contaminate food and water supplies. A systems research approach involving all phases of animal feeding; manure handling, storage and treatment; land application; crop production; and conservation practices and alternative uses will be required to provide solutions to problems associated with animal waste management.

Research on animal waste management is currently conducted at 20 ARS locations in the United States through the Manure and Byproduct Utilization National Program. The mission of this national program is to develop cost effective management practices, technologies, and decision aids that will enable producers to capture the value of manure and other byproducts without degrading environmental quality or posing a threat to human and animal health. Complementary research that addresses environmental aspects of animal waste management is also conducted in the following national programs: Water Quality and Management; Air Quality; and Soil Resource Management. ARS waste management research is coordinated with the needs and activities of other agencies in USDA such as NRCS and CSREES, as well as agencies and organizations outside the Department including EPA and animal commodity groups. This initiative will allow ARS to expand its base research program and to more rapidly provide producers with the tools needed to address animal waste management problems.

Outcomes

Manure will be used with increased efficiency in agricultural production systems, while controlling movement of nutrients and gaseous emissions to water and air. Pathogens will be prevented from contaminating water and

food, thus increasing food safety and environmental health. The quality of soils for crop production will be enhanced by reducing erosion and increasing soil organic matter. Energy costs will be reduced by substituting renewable nutrient sources such as manure for synthetic fertilizers, increasing nutrient use efficiency, and decreasing nutrient losses. Value added products will be developed from manure.

The proposed research supports Performance Goal 2.1.2.1: Demonstrate new integrated technologies to protect plants, animals, and ecosystems; Performance Goal 4.2.1.1: Risk-reduction strategies and methods transferred to the Nation's agricultural industry; Performance Goal 4.3.3.1: Develop and demonstrate management practices and technologies to effectively handle, store, treat, and apply waste to obtain consistent economic benefits, while protecting environmental quality, human health, and animal health; Performance Goal 4.1.3.2: Provide information to public agencies and private organizations and directly to farmers and ranchers that will lead to adoption of improved cropland and grazingland management strategies; and Performance Goal 4.1.1.2: Experimentally demonstrate the appropriateness of watershed-scale technologies and practices that protect the environment and natural resources.

Specific Program Thrusts

- **Manage Risks from Animal Wastes to Enhance Environmental Quality and Protect Human Health** ($5,000,000). ARS will:
  - Determine the processes controlling losses of nutrients, pathogens, pharmaceutically active compounds, particulates (PM-2.5, PM-10), aerosols, ammonia, odor-causing compounds and greenhouse gases from animal wastes to soil, water, and air ($1,900,000).
  - Develop management practices, treatment technologies and decision tools to reduce or eliminate risks to the environment and human health caused by animal waste ($1,900,000).
  - Determine the effectiveness of management practices, treatment technologies and decision tools for protecting water and air from manure nutrients, pathogens and emissions through research and monitoring at the farm and watershed scale ($1,200,000).

c) <u>An increase of $6,500,000 for research in support of the **President's Climate Change Research and Technology Initiatives.**</u>

<u>Explanation of Change</u>.

Climate change encompasses global and regional changes in the earth's atmospheric, hydrological, and biological systems. Agriculture is vulnerable to these environmental changes. Successfully mitigating the causes of climate change, taking economic advantage of new environmental conditions, and adapting to change depends upon a quantitative and predictive understanding of the ways that agricultural systems respond to rising atmospheric carbon dioxide and ozone concentrations, and many other interacting environmental factors.

The agriculture sector offers significant opportunities to slow the increase of greenhouse gases. Soils have the capability to sequester carbon and offset the amounts of greenhouse gases released into the atmosphere. The capacity of soils to store carbon has been estimated but not quantified for different land uses and land management practices. Furthermore, management practices that increase soil carbon may inadvertently cause emissions of methane and nitrous oxide. Research to quantify the amounts of greenhouse gases being exchanged between the soil and the atmosphere under various land uses and land management systems, including lands in conservation programs and in production of biomass crops, will identify practices for food and fiber production that maintain the productive use of the land while maximizing soil carbon storage and minimizing greenhouse gas emissions. Such information will enable planning and management of carbon storage in soils across many scales, from individual farms to large regions, and will facilitate international global climate change negotiations.

Agriculture offers other ways to mitigate greenhouse gases, in addition to carbon sequestration in soils. In the U.S., agriculture contributes only 7 percent of the nation's total global warming potential (GWP), but worldwide, the amount approaches 20 percent. In the U.S., agriculture is responsible for about one-third of the nation's methane emissions (mostly from ruminant animals and their manures) and two-thirds of the nitrous oxide

emissions (arising primarily from soils to which nitrogen fertilizers have been applied). Methane and nitrous oxide have GWP values of 21 and 310 times that of carbon dioxide, respectively, so small reductions in the concentrations of methane and nitrous oxide in the atmosphere have the same impact as larger reductions in carbon dioxide. Thus, identification and management of significant agricultural sinks for methane and nitrous oxide, as well as development of technologies that will minimize agriculture's emissions of these two gases, will make substantial contributions to reducing the nation's GWP. Such management options could be made available in developing countries for further global reductions.

Although much research has demonstrated the "CO_2 fertilization effect" that stimulates crop growth and yield, many other biotic and abiotic factors in the environment that also respond to CO_2 and climate may create stresses that offset expected gains in crop yield and quality. Reliable forecasts of the impact of rising concentrations of atmospheric CO_2 will require more information than currently available on how plant response to CO_2 is modified by such factors in multiple combinations. Impacts of increasing atmospheric CO_2, increasing weather variability, pests that are also exposed to climate change, and other agroecosystem characteristics such as soil moisture, soil fertility, and ground level ozone that is toxic to crops must be quantified. Such new information will enable reliable projections of food security, market competitiveness, and removal of carbon from the atmosphere by crops, forages, and biomass crops.

The management of agricultural systems to store carbon and mitigate climate change will require accurate tools and methods for measuring carbon in the environment under widely different production systems and soil conditions, and at a range of scales in time and space. Technologies are needed for rapid, on-site measurement of soil carbon. Data collected by such tools must enable analyses that reveal changes in soil carbon in individual fields, yet support remote sensing and modeling estimates of carbon stored in regions as large as continents. Tools developed for rapid measurement of carbon and the analytical methods to estimate carbon at larger scales will be useful for precise, site specific application of management decisions that can maximize the carbon stored in a field or regions despite variation in soil conditions, crop growth, or topography. The ability to make accurate estimates of carbon stored in different areas will support market based carbon sequestration and trading options.

Changes in precipitation frequencies and quantities are projected with changing climate. Nearly 90 percent of the snow and rain in the U.S. falls on privately owned land, including watersheds in which agriculture is the major land use. In Western States where over 80 percent of the fresh water is used for irrigation, annual water demands frequently exceed annual average local precipitation. Thus, with climate change and the possible redistribution of precipitation patterns, agricultural uses of water may face increasing competition with other uses, such as hydroelectric or municipal water requirements. Research is needed to support risk assessment and management of water resources in response to global change, and for reducing the uncertainty of sufficient water for agriculture, energy, municipalities, and other sectors.

This initiative builds upon research particularly in the Global Change National Program, but also in Soil Resource Management and other ARS national programs. The objectives of ARS' Global Change National Program are to develop the information and tools necessary for agriculture to adapt to or mitigate climate change. ARS has base programs on carbon cycle and carbon storage, trace gases (methane and nitrous oxide), agricultural ecosystem impacts, and changes in weather and the water cycle. This research is conducted at more than 20 locations across the U.S. An additional 20 locations will become involved as a result of this initiative.

ARS global change related research is coordinated with that of other Federal agencies through ARS' involvement with interagency workgroups in United States Global Change Research Program and other agency and organization interactions. In response to the President's announcement of two major initiatives on climate change, ARS has requested increases which build upon its base program to address Presidential priorities. Specifically, new efforts will focus on developing climate change mitigation technologies and practices for the agricultural sector, reducing uncertainties in the terrestrial carbon cycle, and improving ways to manage potential risks of climate change on agriculture at the field, farm, regional, and national levels.

Outcomes

The proposed research will provide information on balancing carbon storage and agricultural productivity in different agricultural systems across the nation, and potential carbon storage and emissions from the agriculture sector in other countries around the world. The proposed research will also provide information on: how to manage livestock, manures, fertilizers, biological nitrogen fixation, and soils to minimize emissions and increase sinks for methane and nitrous oxide; growth, yield, and carbon storage by different crops and forages exposed to complex, multiple interactions of increasing carbon dioxide concentrations, climate change, weather variability, changing pest ranges and activities, and other environmental changes; and how management decisions can sustain production and market competitiveness in a changing environment. Tools and projection methods for accurately quantifying carbon stored in agricultural soils under different management systems, at different locations, over varying time periods, and across a wide range of geographic scales, in support of international negotiations and market-based incentives for carbon storage will be provided. Information will also be provided to support risk assessments and management for agriculture-dominated watersheds in which competition for water supplies must include agriculture, municipal, energy, and other uses.

ARS research in these areas supports Performance Goal 2.2.1.1: Transfer knowledge developed by ARS to industry and regulatory agencies; Performance Goal 4.1.1.1: Demonstrate concepts and on-farm agricultural technologies and management practices that maintain and enhance the environment and natural resource base; Performance Goal 4.1.2.1: Documentation of agriculture's effects on the global environment; Performance Goal 4.1.2.2: Documentation of how changes in the global environment affect agriculture; and Performance Goal 4.3.2.1: Demonstrate the effectiveness of integrated agricultural production systems in the improvement of natural resources and the protection of the environment.

Specific Program Thrusts

- **ARS Climate Change Research Initiative for Mitigation and Adaptation through Agricultural Systems Management** (In response to the President's National Climate Change Research Initiative) ($2,000,000).
  - *Carbon Cycle: Agroecosystem Responses to Global Change and Management ($1,000,000).* ARS will conduct interdisciplinary research to reduce uncertainties associated with projecting food supplies, food quality, and carbon sequestration by agricultural systems exposed to multiple environmental changes, including atmospheric carbon dioxide concentrations, water supply, soil fertility, pest management, crop varietal selection, and tropospheric ozone. Mechanisms underlying responses will be studied to identify those factors that will sustain production and enhance marketability.

  - *Assess and Manage Risks to Agricultural Production and Water Supplies Arising from Weather Variability ($1,000,000).* ARS will use remote sensing and computer models to project water availability from local to regional scales. Ways to characterize climate and weather variability and extremes will be developed to enable farm and rangeland managers to make decisions based in part on short- and long-term projections of water availability.

- **ARS Climate Change Technology in Agriculture Initiative** (In response to the President's National Climate Change Technology Initiative) ($4,500,000).
  - *Land Use and Land Management Impacts on Carbon Sequestration ($3,000,000).* ARS will expand a small existing network of Western rangeland sites to quantify the exchange of greenhouse gases between the atmosphere and the soil in a variety of crop and grazing systems across the nation. Twenty new sites will be established in a variety of cropping systems and soil types. Combinations of practices (e.g., tillage and residue management, crop rotation, and cover crops) and new management options will be studied on different soil types, topographies, and environmental conditions to identify the best methods to maximize carbon storage in agricultural soils. The role of biomass and biofuel crops, conservation programs, site specific management, and other options will be evaluated.

  - *Measurement, Verification, and Modeling of Carbon Storage ($500,000).* ARS will develop tools in partnership with other agencies that can make rapid and accurate measurements of carbon (and its many chemical forms) in many different types of soils. Tools will be adapted for use that will permit deployment of the tool across production scale fields to obtain maps of carbon distribution. In combination

with data obtained on carbon storage under different management and soil conditions (obtained in the *Land Use and Land Management* initiative identified above), methods for estimating carbon in agricultural landscapes and projecting how long it can be expected to remain sequestered will be developed. Remote sensing tools will be evaluated for their use in making large scale determinations of soil carbon, and estimates will be verified with on-site measurements. The application of rapid measurement tools for site specific management will be assessed. New data and estimates will be compared to existing databases such as NRCS soil surveys and estimates from other calculations, such as those used by the Intergovernmental Panel on Climate Change, or existing models such as CQUESTER and CENTURY.

– *Management of Agricultural Systems to Minimize Trace Gas Emissions ($1,000,000).* ARS will identify ways to decrease methane emissions associated with livestock by increasing animal feed conversion efficiency, and developing feed additives and improved forages to reduce methane emissions by ruminants, and by developing handling and disposal systems that restrict losses of gases from manures. Research will improve nitrogen fertilizer use efficiency by reducing erosion losses, leaching, and volatilization, and increasing uses of biological nitrogen fixation and organic sources of nitrogen. Processes within agricultural systems, including biological processes in soils, that increase sinks for methane and nitrous oxide will be identified and evaluated for responsiveness to management options.

d) An increase of $27,000 for the Federal Employees' Compensation Act (FECA) Program.

The FY 2003 budget will include language in the General Provisions of the Treasury – Postal Appropriations Bill to permit the Department of Labor to add an administrative surcharge to the amount it charges each agency for its FECA benefits.

e) A total increase of $4,517,000, for a total FY 2003 need of $42,641,000, for Employee Pension and Annuitant Health Benefits of which $509,000 is for Soil, Water, and Air Sciences.

The Administration has proposed legislation to require agencies to pay the full share of accruing employee pensions and annuitant health benefits beginning in FY 2003.

f) A decrease of $1,421,000 in ongoing research programs and laboratory closures to provide savings to finance higher priority research initiatives.

The Federal Agriculture Improvement and Reform Act of 1996 mandated the establishment of a "Strategic Planning Task Force" to review all currently operating agricultural research facilities constructed in whole or in part with Federal funds, and all planned agricultural research facilities proposed to be constructed with Federal funds to ensure that a comprehensive research capacity is maintained. The Task Force incorporated its vision and its supporting principles and recommendations into a 10-year plan. As a result of site visits, laboratory reviews, reports from agencies and data reviewed, the Task Force recommended a number of laboratory closures and consolidations. These are documented in a 108 page USDA publication dated August 1999.

In response to the recommendations of the Strategic Planning Task Force, and the Administration's general policy of fiscal restraint, the President's FY 2003 Budget proposes the following laboratory closure:

– New England Plant, Soil, and Water Research Laboratory, Orono, Maine ($1,421,000)
The Task Force recommended that this research location be closed since similar work is being conducted at other locations. The mission of the New England Plant, Soil, and Water Research Laboratory is to develop sustainable, environmentally sound crop management systems characterized by profitability, efficient use of nutrients, and control of disease/insect/ weed pests with minimal chemical inputs. This action will terminate all ARS research activities at this location.

g) A decrease of $10,737,000 for the termination of Congressionally-designated projects appropriated in FY 2001 and 2002 in Soil, Water, and Air Sciences research to provide savings to finance higher priority research initiatives.

The Fiscal Year 2003 budget recognizes the critical importance of a strong USDA research program that is flexible enough to both respond and seek out the challenges and opportunities of the 21st century, but to do it within the reality of fiscal limitations. Therefore, if we want to make the most effective use of the taxpayers' dollars, we must continually reevaluate our portfolio, and set priorities, not only at the margin but among all of our programs. For that reason, we have proposed the termination of unrequested Congressionally targeted earmarks within the Soil, Water, and Air Sciences research program.

The projects recommended for elimination under this Objective are:

--Conservation Research (Pendleton, OR)
--Mid-West/Mid-South Irrigation Research (Columbia, MO)
--National Sedimentation Laboratory/ Acoustics Research (Oxford, MS)
--National Sedimentation Laboratory/Yazoo TMDL's (Oxford, MS)
--National Sedimentation Laboratory/Yazoo Basin (Oxford, MS)
--National Soil Dynamics Laboratory (Auburn, AL)
--Pasture Systems and Watershed Management/Microbial Pathogens in Small Watersheds (University Park, PA)
--Soil Tilth Research (Ames, IA)
--Waste Management Research (Starkville, MS)
--Water Use Management Technology (Tifton, GA)
--Watershed Research (Columbia, MO)
--Western Grazinglands Research (Burns, OR)
-- Biomineral Soil Amendments for Control of Nematodes (Beltsville, MD)
-- Dryland Production Research (Akron, CO)
--Improved Animal Waste Management/Animal Waste Treatment Research (Florence, SC)
--Improved Crop Production Practices (Auburn, AL)
--Irrigated Cropping Systems in the Mid-South (Stoneville, MS)
--Manure Management Research (Ames, IA)
--New England Plant, Soil, and Water Laboratory/ Soil Physicist (Orono, ME)
--Northern Great Plains Research Laboratory (Mandan, ND)
--Quantify Basin Water Budget Components in the Southwest (Tucson, AZ)
--Seismic and Acoustic Technologies in Soils Sed. Laboratory (Oxford, MS)
--Soil, Plant Nutrient Research/Plant Physiology Scientist/Res. Spt. (Ft. Collins, CO)
--Source Water Protection Initiatives (Columbus, OH; West Lafayette, IN)
--Water Resources Management Research (Tifton, GA)

OBJECTIVE 2: PLANT SCIENCES

1) A decrease of $21,188,000 for research on Plant Sciences consisting of:

a) An increase of $14,377,000 which includes an increase of $7,629,000 for restoration of FY 2002 pay costs, and an increase of $6,748,000 which includes $4,391,000 for the annualization of the FY 2003 pay raise and $2,357,000 for the anticipated FY 2003 pay raise.

ARS proposes an increase of $14,377,000 for pay costs in FY 2003. While increased appropriations proposed in the President's FY 2002 Budget for pay were agreed to by the House and Senate, final Conference action dropped this essential funding. The Agency is requesting that pay costs effective in FY 2002 be restored. In

addition, the President's Budget recommends funding for proposed pay costs that are anticipated in FY 2003.

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these costs reduces the number of scientists and support personnel and operating funds essential to maintain and conduct viable research programs. If funds for increased pay costs are not provided, ARS will be unable to fill some essential positions, and will have to reduce spending in all non-pay areas including laboratory equipment and supplies needed to carry out the Agency's research programs.

b) An increase of $500,000 for research to thwart **Plant Pathogens that Could Significantly Harm Agricultural Productivity and U.S. Trade (Counter-Terrorism)**.

Explanation of Change.

Because of its size, complexity, and integration, compared to other countries, U.S. agriculture is uniquely vulnerable to highly infectious diseases and pests, particularly foreign diseases not endemic to the United States. Agricultural exports are the largest positive contributor to the U.S. balance of trade so that protecting U.S. agriculture equates to protecting one of the major infrastructures of the U.S. economy. A General Accounting Office report (C-RCED-98-1) cites the extensive research efforts some countries have undertaken in developing biological warfare agents directed at animal and plant agriculture. The report indicates that U.S. agriculture is a potential target. Intelligence gathered following the Gulf War and the breakup of the former Soviet Union further confirmed that agricultural commodities and food supplies were targets for foreign bioweapons development.

The USDA has successfully and repeatedly prevented widespread damage caused by numerous accidental introductions of nonendemic diseases in the past by quickly controlling outbreaks. Disease outbreaks from the malicious introduction of pathogens could have profound impacts on the national infrastructure, the domestic economy, and export markets. It would negatively affect consumer confidence in the safety of U.S. products and the government's ability to handle national agricultural disease or toxin emergencies. Such events could circumvent control and prevention measures and quickly overcome the capacity of the present USDA infrastructure. Disease pathogens that could be used to debilitate U.S. agriculture include highly infectious viruses, bacteria, nematodes, fungi, and insects that attack major commodities, such as cattle, swine, poultry, cereals, vegetables, and fruits, all of which form the basis of the U.S. agricultural economy and domestic food security.

Apart from actual disease losses, bioterrorism could involve the intentional introduction of diseases and insects which would impact U.S. agriculture through trade disruption. Animal and plant pathogens with the capacity to significantly harm agricultural productivity and U.S. trade would be examined with cutting edge research tools and techniques. Plant diseases of concern include: wheat rust, karnal bunt, soybean rust, bacterial rice blight, Gibberella ear rot, sorghum ergot, barley Wirrega blotch, potato ring rot, stone fruit plum pox, and citrus canker.

Outcomes

The proposed research will develop rapid and simple diagnostic tools for use by field staffs to identify the causes of disease outbreaks and prevent further spread. New diagnostic tests will improve global disease and pest surveillance and enhance international trade. These new technologies will enhance U.S. food security and strengthen the nation's competitiveness in global markets.

ARS research in these areas supports Performance Goal 2.1.2.1: Demonstrate new integrated technologies to protect plants, animals, and ecosystems; and Performance Goal 3.1.4: Rapid responses to crises.

Specific Program Thrusts

- **Develop More Sensitive and Discriminating On-Site Rapid Pathogen Detection and Identification Methodologies for Food Threat Pathogens ($250,000).** Traditionally, diagnostic tests for most diseases are performed individually only by trained personnel in a laboratory with results produced in hours to days

leading to delays in diagnosis that can result in seeding epidemics. However, there now are first generation rapid detection and identification devices the size of a medium suitcase and no heavier than 60 pounds that can perform field testing immediately for selected pathogens. Obtained within one hour, results can be simultaneously transmitted via internet communication globally to designated locations. This testing methodology can distinguish the causative disease from others that demonstrate similar clinical signs and confuse diagnosis. ARS will:
--Develop detection and identification methodologies for plant pathogens.
--Provide regulatory agencies/key decision makers with immediate scientific data to support critical decisions.

- **Generate a Full Functional Gnomic Analytic Sequencing Capability for All Threatening Agents to Include High-Throughput Technologies Providing a Series of New Capabilities** ($250,000). This initiative will provide for molecular identification based on a specific pathogen's gnomic sequences to permit building epidemiological maps and models of foreign diseases/pathogens of concern. This data will assist in determination of geographical origin important to: determine its potential for spread (e.g., modeling); improve understanding of disease prevalence; generate more accurate estimates of the economic impact of disease on production; provide the needed biological substrate to enhance microbial forensics identification supporting law enforcement activities; and use bioinformatics and genome sequence analysis and mapping to obtain new insight into microbial pathogenesis, virulence, diagnostics, prophylaxis, therapeutics, host range specificity, and identification of disease resistance genes in plant populations and control approaches. In long-term, the combination of new advances in microelectronics, computer sciences, and microbial genomics will make possible the development of unattended devices to analyze air, water, plants, and other materials on the farm, at the slaughter plant, food/drink processing plants, and import or quarantine stations including ports.

c) An increase of $5,357,000 for research in support of new prevention and control strategies for Emerging, Reemerging, and Exotic Diseases of Plants.

Explanation of Change.

Exotic and emerging plant diseases pose severe problems throughout the U.S. Citrus canker threatens Florida's $8.5 billion citrus industry. Sudden Oak Death is killing large numbers of oak trees along the California and Oregon coast. This disease also appears to be affecting rhododendron and related species which may severely impact the nursery and other horticultural industries. The increasing importance of exotic and emerging plant diseases may be attributed to the introduction of pathogens into new geographic regions; modification of the environments that favor diseases; changes in crop management practices; genetic shifts in the pathogen populations; and other processes that may give them an advantage.

It is important to identify new or unknown pathogens, determine their geographic origin, and biologically characterize them. Accurate taxonomic identification including classification of such pathogens is essential. Pathogenicity studies and molecular markers are needed to discriminate isolates and determine host range. Infectious pathogens from purposeful or malicious introduction needs to be rapidly identified and controlled. Continued development of pathogen detection, exclusion, and quarantine treatment technologies is important, both for keeping new diseases from becoming established in the U.S., and in producing crops and commodities that can be shipped and sold in markets around the world.

Research and development of new disease management technologies, particularly biologically-based ones, such as host-plant resistance, biological control, cultural control, and others must be expanded. Research on integration of different control technologies into effective, economical, and sustainable integrated disease management systems should be conducted so that practical solutions can be transferred to agricultural producers, processors, and land managers.

ARS develops priorities for reemerging and exotic disease research in partnership with APHIS and other regulatory agencies. In response to these disease problems, ARS and APHIS meet with representatives from the impacted industries and other Federal and State agencies. Needs are assessed and appropriate approaches

determined for providing the scientific research required for effective regulatory action. In addition to significant coordination at the field level, ARS works closely with its counterparts in APHIS to coordinate and prioritize immediate research needs for detection and eradication. ARS research on the pests and pathogens spans basic biology of the organism to effective methods to implement regulatory action.

Outcomes

The proposed research on emerging and exotic diseases of plants will minimize or prevent the establishment of pathogens in the U.S. Commodities and crops produced in the U.S. will be of higher quality for domestic consumption and more marketable internationally. New, more rapid and accurate detection and identification of unknown pathogens will provide short-term solutions. Long-term solutions will be made available through integrated control strategies, and pathogenicity studies to determine host range and virulence. Development of resistance germplasm and more sustainable, environmentally friendly control strategies will be conducted to provide practical solutions for U.S. farmers and producers.

ARS research in these areas supports Performance Goal 1.1.2.1: Demonstrate techniques to control or eliminate postharvest insects and diseases, and increase market quality and product longevity; Performance Goal 1.1.2.3: New and improved diagnostic tests are developed and available; Performance Goal 2.1.2.1: Demonstrate new integrated technologies to protect plants, animals, and ecosystems; Performance Goal 2.1.3.1: Collections of well-documented germplasm of importance to U.S. agricultural security are readily available to scientists and breeders for research and development; Performance Goal 2.1.3.3: Release of improved germplasm, varieties, and breeds based on effective use of genetic resources; Performance Goal 2.1.3.4: Improve methods for identifying useful properties of plants, animals, and other organisms, and for manipulating the genes with these properties; Performance Goal 2.2.1.1: Transfer knowledge developed by ARS to industry and regulatory agencies; and Performance Goal 4.3.1.1: Deliver integrated pest management strategies that are cost effective and protect natural resources, human health, and the environment.

Specific Program Thrusts

- **Identify and Characterize Exotic Plant Diseases** ($2,107,000). ARS will:
  - Develop pathogen detection and improved diagnostic tests.
  - Identify pathogens and understand pathogen/vector relationships. Biological and molecular characterization to better understand the epidemiology or outbreak of disease and spread of the causative pathogen are critical in deciding which control actions will be most effective.

- **Prevent Exotic Plant Diseases** ($1,750,000). ARS will:
  - Develop rapid and accurate identification methods to make possible early warning and prevent new diseases from becoming established in the U.S.
  - Conduct research on biochemical and physiological processes that operate in the host and pathogen as infection and disease progress. Research will be performed to improve genetic resistance to diseases in plants, including identifying resistance genes.
  - Develop pathogen exclusion and quarantine treatment technologies which are critically important for prevention.

- **Control Exotic Plant Diseases (i.e., Biological, Cultural, and Chemical Control; and Biology of Pathogens)** ($1,000,000). ARS will:
  - Develop molecular characterization and improved methods of biological control to help replace or supplement synthetic pesticides in an environmentally friendly manner.
  - Develop methods to mass produce, store, and apply biological control agents.

- **Address Emerging Diseases Offshore** ($500,000). ARS will:
  - Develop tools to exclude potential exotic pathogens, quicker detection, more accurate diagnosis, and more effective control of emerging and exotic diseases.

d) <u>An increase of $2,950,000 for research in support of Agricultural Genomes.</u>

Explanation of Change.

The U.S. agricultural system now faces formidable challenges such as: water and soil pollution; environmental regulations which may rapidly complicate agricultural production and processing; new pests and pathogens; and the extinction or inaccessibility of genetic resources resulting in increased genetic vulnerability of crops. These challenges can only be met by harnessing the inherent potential of genetic resources.

More rapid and efficient methods are required to characterize, identify, and manipulate the useful properties of genes and genomes. Current methods, collectively termed "genomics," rely on ever more detailed, accurate, and comprehensive knowledge of gnomic organization to efficiently characterize genes and elucidate their function. Genomics and biotechnology are critical for: developing improved crops that enable producers to maximize yields of high quality products, while minimizing environmental degradation and production costs; improving the efficiency of production; improving the accuracy of genetic selection; generating data on important virulence genes; and determining how genes may either be utilized or controlled for disease prevention in plants. In order to facilitate more efficient use of time and resources, programs need to be established for the collection and handling of sequence information, and the identification and characterization of genes of agricultural importance. These undertakings will be financed through coordinated initiatives in ARS, CSREES, NSF, and DOE. They support the Department's principles on food and agricultural policy by enhancing agricultural competitiveness and animal and plant health.

Ongoing research involves identifying genetic markers for germplasm characterization, marker-assisted breeding, and varietal identification. Quantitative trait loci (QTLs) are being identified in genetic populations that are linked with important agricultural traits. Sequence information is needed to identify the genes that underlie the quantitative traits. Ultimately, the sequence information can be used to screen raw germplasm collections to identify valuable genes that can be used for superior new crop varieties.

Outcomes

The proposed research will provide the means for maintaining and enhancing the quality and safety of the U.S. food supply. Agricultural competitiveness in global markets will be increased by ensuring the continued genetic improvement of crops.

ARS research in these areas supports Performance Goal 2.1.3.1: Collections of well-documented germplasm of importance to U.S. agricultural security are readily available to scientists and breeders for research and development; Performance Goal 2.1.3.2: Documented DNA base sequences of agricultural importance; Performance Goal 2.1.3.3: Release of improved germplasm, varieties, and breeds based on effective use of genetic resources; and Performance Goal 2.1.3.4: Improve methods for identifying useful properties of plants, animals, and other organisms, and for manipulating the genes associated with these properties.

Specific Program Thrust

- **Plant/Crop Genome Sequencing** ($2,950,000). ARS will:
  - Support gnomic sequencing efforts for maize, legumes, microbes, and insects. This effort will significantly expedite gene discovery and the development of physical (BAC) maps and SNP markers for maize, soybeans, alfalfa, and other legumes, and microbes and insects. Thereafter, these funds will be distributed to agency laboratories to support functional genomics of these species.

e) An increase of $3,600,000 for research in support of **Biotechnology Risk Assessment and Risk Management.**

Explanation of Change.

In April 2000, the National Academy of Sciences issued a report, "Genetically Modified Pest-Protected

Plants." The report affirms that genetically engineered organisms are not inherently more dangerous than similar organisms derived from conventional selection and breeding. However, it identified several areas that need further study. New ARS initiatives will provide publicly available data on the characteristics of genetically engineered crops and the long-term ecological impacts of such crops, emphasizing those identified by the National Academy. These include such issues as preventing the development of resistance in pest populations, effects on non-target species, and gene flow from crops to surrounding vegetation. The last topic is particularly urgent in light of legal questions of responsibility when proprietary genes are transferred from one farm to another by pollen dispersal. For crops in which gene transfer is considered most likely and potentially most damaging, technologies will be modified or developed to mitigate the risk. These can include biotech approaches that inhibit pollen or seed viability, as well as ecological approaches, such as establishment of safe "buffer zones" between crops, or other management practices to reduce risk.

ARS research is at the forefront in determining the consequences of using genetic modified organisms (GMOs). These activities involve the development of strategies to prevent the buildup of resistance in crop pest populations; the assessment of the affects of GMOs on non-target organisms, such as the monarch butterfly; and in the reduction of herbicide and insecticide runoff from GMO fields compared to conventional fields. ARS has also co-developed the only current technology capable of preventing the spread of transgenes from crops through closely related plants in the natural environment, and has developed the means to remove unwanted foreign genes from plants. In addition to in-house research, ARS co-manages (with CSREES) a competitively awarded biosafety grants program. One percent of all ARS biotechnology research funds are set aside for support of this program, which in FY 2001 resulted in approximately $900,000 for the grants program.

Outcomes

The outcomes of this research will be improved knowledge of the long-term ecological effects of genetically engineered crops, especially in comparison to conventional crops with similar properties. The database will provide regulatory agencies with information to determine the magnitude of environmental risks associated with genetically engineered crops, and to compare them to the environmental risks of alternatives (conventional crops) that are widely accepted today. Some of the research is also aimed at reducing risks so that the crops can be more widely accepted.

ARS research in these areas supports Performance Goal 1.1.2.1: Demonstrate techniques to control or eliminate postharvest insects and diseases, and increase market quality and product longevity; Performance Goal 1.1.2.3: New and improved diagnostic tests are developed and available; Performance Goal 2.1.3.1: Collection of well-documented germplasm of importance to U.S. agricultural security are readily available to scientists and breeders for research and development; Performance Goal 2.1.3.3: Releases of improved germplasm, varieties, and breeds based on effective use of genetic resources; Performance Goal 2.1.3.4: Improve methods for identifying useful properties of plants, animals, and other organisms, and for manipulating the genes associated with these properties; and Performance Goal 2.1.4.1: Make technologies available for improving productivity, safety, quality, and the security of the agricultural production system.

Specific Program Thrusts

- **Determine Rates of Gene Flow, Including Transgenes, from Crops to Nearby Vegetation** ($1,000,000). ARS will:
  - Determine the potential for pollinator or vector transfer of introduced transgenes from genetically engineered plants into other plants, particularly nearby non-transgenic plants of the same crop and closely related weeds.
  - Use molecular technology to assess foreign DNA incorporation into the weed genome.
  - Develop models to assess the effects of induced mutations in transgenes and their potential effect on weedy species.
  - Develop strategies to promote more precise and predictable genetic engineering of crop plants.

- **Develop and Test Novel Strategies to Prevent Pest Populations Becoming Resistant to Plant Incorporated Protectants ($750,000).** ARS will:
  - Reduce pressure on pest populations to evolve resistance to transgenes by developing the use of multiline transgenic populations containing genes which have varying and multiple resistance to plant diseases.
  - Identify and develop candidate transgenes with less potency to reduce evolutionary pressure on pest populations.
  - Develop strategies for more precise and predictable expression of transgenes.
  - Develop optimum ecological strategies to prevent genetic expression of recessive resistance genes in pest populations.

- **Identify and Develop Gene Technology That Will Limit Transgene Activity to Specific Tissues** ($1,850,000). ARS will:
  - Develop tailored gene promoters that will direct the accumulation of gene products to various tissues, thus providing biotechnology with the ability to "design" transgene activities into plants to meet pest resistance criteria without loss of the plant's commercial value. The new technology will also minimize the risk attendant to the accumulation of transgenic products in the environment because the transgenes will be inactive in most of the crop plant's tissues.

f) An increase of $2,700,000 for research in support of Controlling Invasive Species.

Explanation of Change.

Invasive insects, weeds, and other pests species cost the United States over $137 billion per year. Invasive species impact production agriculture and are second only to loss of habitat in causing negative impacts on environmental areas and loss of biological diversity. There are more than 30,000 invasive species in the United States, many of them undescribed, and the number is growing. This growing threat prompted the formation of an "Invasive Species Council" in 1999 which provides guidance to agencies for increasing their efforts to exclude, detect, and eradicate incipient populations and to manage established species.

Weeds, such as leafy spurge, melaleuca, old world climbing fern, giant salvinia, salt cedar, hydrilla, water hyacinth, yellow starthistle, downy brome, Brazilian pepper, jointed goat grass, purple loosestrife, and many others infest at least 100 million acres in the United States which increases 8 to 20 percent annually. These aggressive, destructive pests are extremely difficult to control, especially because land is owned in checkerboard patterns, with control actions not coordinated across boundaries. Weeds result in reductions that amount to about 12 percent in crop yields or about $36 billion annually, and 20 percent in forage yields or about $2 billion annually. One hundred million dollars is spent on aquatic weed control annually. About half of the threatened and endangered plant species in the United States are primarily at risk because of invasive weeds. In 1996, USDA approved a Strategic Plan for Invasive and Noxious Weeds to help coordinate activities. In 1997, a "National Strategy for Invasive Plant Management" was approved by over 100 public and private groups, including USDA. ARS has implemented a similar strategic plan for weed management.

Arthropods (insects and mites), such as glassy-winged sharpshooter, silverleaf whitefly and other whiteflies, Asian longhorned beetle, Russian wheat aphid, pink hibiscus mealybug, cereal leaf beetle, Chinese soybean aphid, fruit flies, imported fire ant, Formosan termite, mite and beetle pests of bees, and many others are high priority targets for integrated pest management. Arthropod pests destroy 13 percent of crop production each year, costing about $36 billion, with invasive arthropods causing about $14 billion of this total. Another $1.5 billion annually is lost to lawn and garden pests, such as Japanese beetle. Like weeds, new species of arthropod pests appear in the United States each year.

ARS conducts extensive research on the long-term management of established invasive species, emphasizing biologically-based integrated pest management activities. ARS provides research in support of action agencies,

such as APHIS, to reduce the rate of introduction of invasive species, and to rapidly detect, identify and eradicate incipient species. ARS also works closely on this issue with States and local governments; other USDA agencies, such as CSREES, FS, ERS, NRCS: State Agricultural Experiment Stations; Department of Interior agencies; Department of Defense; the private sector; and international partners.

Outcomes

Some of the proposed research is in support of action agencies, such as the Animal and Plant Health Inspection Service. This research will result in exclusion of more potential invasive species, quicker detection, and more effective eradication of new invading species. It will also result in more efficient long term management of established invasive species. These improvements will result from emphasizing systematics, biologically-based integrated pest management, and ecosystem management.

ARS research in these areas supports Performance Goal 1.1.1.1: Demonstrate and transfer to users integrated systems; Performance Goal 1.1.2.3: New and improved diagnostic tests are developed and available; Performance Goal 2.1.2.1: Demonstrate new integrated technologies to protect plants, animals, and ecosystems; Performance Goal 2.2.1.1: Transfer knowledge developed by ARS to industry and regulatory agencies; and Performance Goal 4.3.1.1: Deliver integrated pest management strategies that are cost-effective and protect natural resources, human health and the environment.

Specific Program Thrusts

- **Systematics of Insect Pests and Natural Enemies of Invasive Insects and Weeds** ($450,000). ARS will:
  - Conduct systematics research on major invasive insects, such as plant disease vectoring thrips and leaf-mining flies, and natural enemies exhibiting potential for controlling these pests.

- **Develop Attractants and Other Methods for Controlling Invasive Insects** ($320,000). ARS will:
  - Isolate and develop attractants as lures for trapping invasive species, such as Harmonia (Asian ladybird beetle).
  - Develop acoustics and other wave-based strategies for detecting Asian long-horned beetles and other cryptic pests.
  - Develop sound-based systems for detecting and trapping insects that communicate by sound rather than smell (e.g., leafhoppers, such as the glassy-winged sharpshooter).

- **Develop Biological Control Programs for Invasive Insects and Weeds** ($1,930,000). ARS will:
  - Develop classical and augmentative biological control approaches (using parasites, predators, and pathogens) for managing invasive insect and weed species.
  - Develop classical biological control technologies for newly introduced insect pests in Western States, such as the olive fruit fly and pink hibiscus mealybug. ARS will also develop robotic mechanization and production of biological control agents for invasive insect and weed pests; biologically-based methodologies for control of plant canopy and soil inhabiting invasive beetle pests that attack horticultural and nursery crops; and IPM component technologies for control of invasive insect pests as vectors of melon crop diseases.

g) An increase of $4,000,000 for research in support of Agricultural Genetic Resources.

Explanation of Change.

ARS will collect, identify, characterize, and incorporate plant germplasm into centralized gene banks. In April 2001, the Secretary of Agriculture's Advisory Committee on Agricultural Biotechnology (ACAB), representing a broad range of over thirty stakeholder interests, recommended that the USDA double the budget for germplasm preservation and utilization. There is consensus among stakeholders that the U.S. needs to preserve genetic diversity in crop germplasm including, horticultural species that can provide abundant high quality food and fiber. Increased support of this program will expand, preserve, and distribute the valuable plant germplasm in the U.S. collections. The value of the U.S. germplasm collections is increasingly apparent with

the discovery of new genomics tools that can rapidly identify scientifically and commercially useful genes.

The U.S. National Plant Germplasm System, managed by ARS, has 436,000 accessions representing over 10,000 species. Over 130,000 samples were distributed in year 2000 (70 percent were distributed to U.S. researchers). Genetic diversity that would otherwise be lost is preserved and readily distributed, thereby broadening the gene pools available to plant breeders and other researchers. However, there continues to be an urgent need to regenerate seeds and other germplasm in the collection. Over 20 percent of the seed accessions and over 80 percent of the clonally propagated material have not been duplicated and stored in a backup location.

Outcomes

The U.S. needs a comprehensive program to maintain threatened plant germplasm; genetic diversity within animal species that provide abundant high quality food and fiber; and microbial and insect germplasm, including pathogens and microorganisms that may be useful to bioconversion, bioremediation, or biocontrol. Present support for this program is inadequate to prevent the risk of extinction and loss of genetic diversity. With the availability of new gnomic tools, genetic diversity is highly valuable for improving production efficiency, and protecting crop germplasm from catastrophic climate and pest losses. ARS will collect, identify, characterize, and incorporate plant, animal, and microbial germplasm into centralized gene banks, and ancillary descriptive databases. The Agency will also encourage germplasm exchange and distribute research quantities of healthy, pure, and adequately characterized germplasm.

ARS research in these areas supports Performance Goal 2.1.3.1: Collections of well-documented germplasm of importance to U.S. agricultural security are readily available to scientists and breeders for research and development; Performance Goal 2.1.3.2: Document DNA base sequences of agricultural importance; Performance Goal 2.1.3.3: Release of improved germplasm varieties, and breeds based on effective use; Performance Goal 2.1.3.4: Improve methods for identifying useful properties of plants, animals, and other organisms, and for manipulating the genes associated with these properties; and Performance Goal 2.2.2.1: Transfer knowledge developed by ARS to industry and regulatory agencies.

Specific Program Thrusts

- **Genetic Resource Acquisition and Distribution** ($1,000,000). ARS will:
  - Identify threatened germplasm in natural habitats and deteriorating gene banks and preserve it in ARS' germplasm collections.
  - Conserve germplasm in nature or in farmers's fields.
  - Encourage germplasm exchange through innovative means and by sharing with germplasm providers.
  - Distribute research quantities of healthy, pure, and adequately characterized germplasm.

- **Genetic Resource Maintenance and Characterization** ($2,000,000). ARS will:
  - Maintain germplasm indefinitely in a healthy, pure, secure, and easily accessible form.
  - Increase plant germplasm through optimal regeneration techniques to preserve its viability/genetic content.
  - Identify and characterize allelic diversity in agriculturally important genes; perfect methods for maintaining germplasm over the long term under low temperature conditions that ensure viability and uniformity; evaluate protocols for storing higher germplasm as DNA or nuclei isolated from cells; and develop more efficient means for multiplying germplasm in gene banks.
  - Establish official insect and microbial germplasm repositories which will be critical to strengthening, broadening, and distributing collections.
  - Microbial Genomics
  - Minor Use Pesticides (IR-4)

- **Genetic Resource Evaluation ($1,000,000).** ARS will:
  - **Evaluate plant germplasm for utility and value.**
  - **Use new molecular tools and gnomic strategies to identify traits with the potential of providing**

greater profitability, production stability, product value, and safety.
- Identify markers (DNA or protein) that are reliably linked with desired traits for use in speeding up genetic selection and breeding.
- Identify DNA sequences, diagnostic for high value traits and use them to develop rapid, reliable DNA-based methods to test and verify genetic identity of identity-preserved, high value grain.
- Release evaluation data to GRIN and/or genome databases.

h) An increase of $95,000 for the Federal Employees' Compensation Act (FECA) Program.

The FY 2003 budget will include language in the General Provisions of the Treasury – Postal Appropriations Bill to permit the Department of Labor to add an administrative surcharge to the amount it charges each agency for its FECA benefits.

i) A total increase of $4,517,000, for a total FY 2003 need of $42,641,000, for Employee Pension and Annuitant Health Benefits of which $1,871,000 is for Plant Sciences.

The Administration has proposed legislation to require agencies to pay the full share of accruing employee pensions and annuitant health benefits beginning in FY 2003.

j) A decrease of $3,446,000 in ongoing research programs and laboratory closures to provide savings to finance higher priority research initiatives.

The Federal Agriculture Improvement and Reform Act of 1996 mandated the establishment of a "Strategic Planning Task Force" to review all currently operating agricultural research facilities constructed in whole or in part with Federal funds, and all planned agricultural research facilities proposed to be constructed with Federal funds to ensure that a comprehensive research capacity is maintained. The Task Force incorporated its vision and its supporting principles and recommendations into a 10-year plan. As a result of site visits, laboratory reviews, reports from agencies and data reviewed, the Task Force recommended a number of laboratory closures and consolidations. These are documented in a 108 page USDA publication dated August 1999.

In response to the recommendations of the Strategic Planning Task Force, and the Administration's general policy of fiscal restraint, the President's FY 2003 Budget proposes the following laboratory closure:

-- Water Management Research Laboratory, Brawley, California ($325,000)
The Task Force recommended that this small research worksite be closed since similar work is being conducted by a University of California research station operating in the Imperial Valley. The mission of this ARS laboratory is to conduct experiments under the saline conditions of the Imperial Valley in support of U.S. agriculture production in desert and arid environments. This proposed closure represents the final phase out of ARS research at this site which was initiated in the last several years. Property management has already been turned over to the Agricultural Commissioner in Imperial County, California.

To eliminate similar efforts, the Task Force also recommended the co-location of all ARS honey bee research activities into either one or two units. Given the condition of some of these facilities, the Task Force identified the following laboratories as candidates for closure and consolidation:

-- Honey Bee Research Laboratory, Baton Rouge, Louisiana ($1,140,000)
The mission of the Honey Bee Breeding Laboratory is to explore and solve honey bee stock production problems caused by varroa mites, tracheal mites, and Africanized bees. The closure of this laboratory

will consolidate all ARS bee research in new facilities at Weslaco, Texas. A portion of existing resources and programs are also being transferred to Weslaco to support the consolidated bee program. The Baton Rouge location will continue to house ARS' soil and water research laboratory.

-- Bee Research Laboratory, Beltsville, Maryland ($1,627,000)
The mission of the Bee Research Laboratory is to conduct research on the biology and control of honey bee parasites, diseases, and pests to ensure an adequate supply of bees for pollination and honey production. The closure of this laboratory will consolidate all ARS bee research at Weslaco, Texas. A portion of existing resources and programs are also being transferred to Weslaco to support the consolidated bee program. Retained at Beltsville are all of the remaining ongoing research of the Henry A. Wallace Beltsville Agricultural Research Center.

-- Honey Bee Research Laboratory, Tucson, Arizona ($354,000)
The mission of the Carl Hayden Bee Research Center is to advance the productivity of agriculture by conducting basic and applied research aimed at optimizing crop yields through application of improved pollinator systems. The closure of this laboratory will consolidate all ARS' bee research in new facilities at Weslaco, Texas. A portion of existing resources and program are also being transferred to Weslaco to support the consolidated bee program. The Tucson location will continue to house ARS' Southwest watershed research laboratory.

k) A decrease of $53,192,000 for the termination of Congressionally-designated projects appropriated in FY 2001 and 2002 in Plant Sciences research to provide savings to finance higher priority research initiatives.

The Fiscal Year 2003 budget recognizes the critical importance of a strong USDA research program that is flexible enough to both respond and seek out the challenges and opportunities of the 21st century, but to do it within the reality of fiscal limitations. Therefore, if we want to make the most effective use of the taxpayers' dollars, we must continually reevaluate our portfolio, and set priorities, not only at the margin but among all of our programs. For that reason, we have proposed the termination of unrequested Congressionally targeted earmarks within the Plant Sciences research program.

The projects recommended for elimination under this Objective are:

--Alternative Crops and Value Added Products Research (Stoneville, MS)
--Appalachian Pasture-Based Beef Systems (Beaver, WV)
--Arctic Germplasm Research (Palmer, AK)
--Bee Research (Logan, UT; Weslaco, TX)
--Biomedical Materials in Plants (Beltsville, MD)
--Cereal Crops Research (Fargo, ND; Madison, WI)
--Citrus/Horticultural Research (Ft. Pierce, FL)
--Corn Resistant to Aflatoxin for the Mid-South (Starkville, MS)
--Ecology of Tamarix (Albany, CA)
--Endophyte Research (Booneville, AR)
--Floriculture/Nursery Crops Research (Headquarters)
--Golden Nematode (Ithaca, NY)
--Grain Legume Plant Pathologist Position (Pullman, WA)
--Grain Research (Manhattan, KS)
--Grape Rootstock Research (Geneva, NY)
--Greenhouse and Hydroponics Research (Wooster, OH)
--Greenhouse Lettuce Germplasm Research (Salinas, CA)
--Integrated Farming Systems/Dairy Forage Research (Madison, WI)
--IPM for Northern Climate Crops (Fairbanks, AK)
--Lettuce Geneticist/Breeder Position (Salinas, CA)
--National Wheat and Barley Scab Initiatives/ Fusarium Head Blight (Various Locations)
--Nematology Research (Tifton, GA)
--Organic Minor Crop Research (Salinas, CA)
--Potato Research Enhancement (Prosser, WA)
--Rangeland Resource Management (Las Cruces, NM)
--Red Imported Fire Ants Research (Stoneville, MS)
--Rice Research (Stuttgart, AR)
--Risk Assessment for Bt. Corn (Ames, IA)
--Root Diseases in Wheat and Barley (Pullman, WA)
--Small Farms Research (Booneville, AR)
--Soybean Cyst Nematode Research (Stoneville, MS)
--Soybean Research in the South (Stoneville, MS)
--Sustainable Vineyard Practices Position (Davis, CA)
--Center for Biological Controls/FAMU (Gainesville, FL)
--Chloroplast Genetic Engineering Research (Urbana, IL)
--Corn Germplasm (Starkville, MS)
--Cotton Genomics, Breeding, and Variety Development (Stoneville, MS)
--Crop Production and Food Processing (Peoria, IL)
--Ft. Pierce Horticultural Research Laboratory (Ft. Pierce, FL)
--Great Basin Rangelands (Reno, NV; Burns, OR; Boise, ID)
--Honey Bee Research/Varroa Mite (Baton Rouge, LA)
--Hops Research (Corvallis, OR)
--Improved Forage Livestock Production (Headquarters)
--Jornada Experimental Range Research Station (Las Cruces, NM)
--Late Blight Fungus (Orono, ME)
--Medicinal Botanical Production and Processing (Beaver, WV)
--Microbial Genomics (Pullman, WA)
--Minor Use Pesticides/IR-4 (Headquarters)
--National Germplasm Resources Program/National Plant Germplasm System (Various Locations)
--National Sclerotinia Initiative (Fargo, ND)
--Northern Grain Insect Laboratory/Cropping System Ecologist (Brookings, SD)
--Northwest Small Fruits Research (Corvallis, OR)
--Oat Virus/Barley/Cereal Yellow Dwarf (West Lafayette, IN)
--Olive Fruit Fly Research (Parlier, CA; Montpellier, France)
--Pecan Scab Research/Pecan Disease Research (Byron, GA)
--Pierce's Disease (Parlier, CA; Ft. Pierce, FL; Davis, CA)
--Plant Stress and Water Conservation Research (Lubbock, TX)
--Potato Breeding Research (Aberdeen, ID)
--Residue Management in Sugarcane/Sugarcane Research (Houma, LA)
--Sorghum Research (Manhattan, KS; Bushland, TX; Stillwater, OK; Lubbock, TX)
--Southwest Pecan Research (College Station, TX)
--Soybean and Nitrogen Fixation (Raleigh, NC)
--Soybean Genetics/Two Geneticists (Columbia, MO)
--Sudden Oak Disease (Ft. Detrick, MD)
--Sugarbeet Research (Kimberly, ID)
--Sugarcane Variety Research (Canal Point, FL)
--Sweet Potato Research (Stoneville, MS)

--U.S. Pacific Basin Agricultural Research Center (Hilo, HI)
--Viticulture Research (Corvallis, OR)
--Aerial Application Research (College Station, TX)
--Small Fruits Research/Ornamentals and Vegetables (Poplarville, MS)
--Appalachian Fruit Research Station (Kearneysville, WV)
--Binational Agricultural Research and Development Program (Headquarters)
--Temperate Fruit Flies (Yakima, WA)
--Turfgrass Research (Washington, DC)
--Bioinformatics Institute for Model Plant Species (Ames, IA)
--Wheat Quality Research (Pullman, WA; Wooster; OH; Manhattan, KS; Fargo, ND)
--Wild Rice Research (St. Paul, MN)
--Woody Genomics and Breeding for the Southeast (Poplarville, MS)
--Rangeland Resources Research (Cheyenne, WY)
--Coffee and Cocao Research (Miami, FL; Beltsville, MD; Hdqts.)
--Vegetable Crops Research (Madison, WI)
--Virus-Free Potato Germplasm (Fairbanks, AK)
--U.S. National Arboretum/Germplasm/Ornamental Horticulture (Washington, DC)

OBJECTIVE 3: ANIMAL SCIENCES

1) An increase of $3,722,000 for research on Animal Sciences consisting of:

a) An increase of $6,982,000 which includes an increase of $3,514,000 for restoration of FY 2002 pay costs and, an increase of $3,468,000 which includes $2,257,000 for the annualization of the FY 2003 pay raise and $1,211,000 for the anticipated FY 2003 pay raise.

ARS proposes an increase of $6,982,000 for pay costs in FY 2003. While increased appropriations proposed in the President's FY 2002 Budget for pay were agreed to by the House and Senate, final Conference action dropped this essential funding. The Agency is requesting that pay costs effective in FY 2002 be restored. In addition, the President's Budget recommends funding for proposed pay costs that are anticipated in FY 2003.

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these costs reduces the number of scientists and support personnel and operating funds essential to maintain and conduct viable research programs. If funds for increased pay costs are not provided, ARS will be unable to fill some essential positions, and will have to reduce spending in all non-pay areas including laboratory equipment and supplies needed to carry out the Agency's research programs.

b) An increase of $4,500,000 for research to thwart **Animal Pathogens that Could Significantly Harm Agricultural Productivity and U.S. Trade (Counter-Terrorism).**

Explanation of Change.

Because of its size, complexity, and integration, compared to other countries, U.S. agriculture is uniquely vulnerable to highly infectious diseases and pests, particularly foreign diseases not endemic to the United States. Agricultural exports ($140 billion annually) are the largest positive contributor to the U.S. balance of trade so that protecting U.S. agriculture equates to protecting one of the major infrastructures of the U.S. economy. A General Accounting Office report (C-RCED-98-1) cites the extensive research efforts some countries have undertaken in developing biological warfare agents directed at animal and plant agriculture. The report indicates that U.S. agriculture is a potential target. Intelligence gathered following the Gulf War and the breakup of the former Soviet Union further confirmed that agricultural commodities and food supplies were targets for foreign bioweapons development.

The USDA has successfully and repeatedly prevented widespread damage caused by numerous accidental introductions of nonendemic diseases in the past by quickly controlling outbreaks. Disease outbreaks from the

malicious introduction of pathogens could have profound impacts on the national infrastructure, the domestic economy, and export markets. It would negatively affect consumer confidence in the safety of U.S. products and the government's ability to handle national agricultural disease or toxin emergencies. Such events could circumvent control and prevention measures and quickly overcome the capacity of the present USDA infrastructure. Disease pathogens that could be used to debilitate U.S. agriculture include highly infectious viruses, bacteria, nematodes, fungi, and insects that attack major commodities, such as cattle, swine, poultry, cereals, vegetables, and fruits, all of which form the basis of the U.S. agricultural economy and domestic food security.

Apart from actual disease losses, bioterrorism could involve the intentional introduction of diseases and insects which would impact U.S. agriculture through trade disruption. Animal and plant pathogens with the capacity to significantly harm agricultural productivity and U.S. trade would be examined with cutting edge research tools and techniques. Animal or zoonotic diseases of concern include: rinderpest, hog cholera (swine fever virus), Newcastle Disease, contagious bovine pleuropneumonia, lumpy skin disease, bluetongue virus, African horsesickness, African swine fever, porcine enterovirus type 9 (swine vesicular disease), *Hendra. HP*, avian influenza, Nipah Rift Valley fever, Venezuelan equine encephalomyelitis, and West Nile fever.

Outcomes

The proposed research will develop rapid and simple diagnostic tools for use by field staffs to identify the causes of disease outbreaks and prevent further spread. New diagnostic tests will improve global disease and pest surveillance and enhance international trade. These new technologies will enhance U.S. food security and strengthen the nation's competitiveness in global markets.

ARS research in these areas supports Performance Goal 2.1.2.1: Demonstrate new integrated technologies to protect plants, animals, and ecosystems; and Performance Goal 3.1.4: Rapid responses to crises.

Specific Program Thrusts

- **Develop More Sensitive and Discriminating On-Site Rapid Pathogen Detection and Identification Methodologies for Animal and Food Threat Pathogens** ($1,750,000). Traditionally, diagnostic tests for most animal diseases are performed individually only by trained personnel in a laboratory with results produced in hours to days leading to delays in diagnosis, which permits continued animal movement for several days that can result in seeding epidemics. However, there now are first generation rapid detection and identification devices the size of a medium suitcase and no heavier than 60 pounds that can perform field testing immediately for selected pathogens. Obtained within one hour, results can be simultaneously transmitted via internet communication globally to designated locations. This testing methodology can distinguish the causative disease from others that demonstrate similar clinical signs and confuse diagnosis. ARS will:
  - Develop detection and identificaton methodologies for animal pathogens.
  - Provide regulatory agencies and key decisionmakers with immediate scientific data to support critical decisions.

- **Develop High Throughput Detection and Identification Technology** ($1,000,000). A systems integrated approach will be developed for assuring pre- and postharvest food security. Current procedures and detection capabilities within USDA are designed to address naturally occurring pathogens that impact agriculture and the food supply system. It is important that identification systems be developed for early detection of contamination of the food supply. It will be necessary to develop automated high throughput capabilities to handle the sheer quantity of samples that would need to be analyzed in the event of an intentional introduction. ARS will develop an automated detection and identification technology for food security with a high throughput capacity.

- **Generate a Full Functional Genomic Analytic Sequencing Capability for All Threatening Agents to Include High-Throughput Technologies Providing a Series of New Capabilities** ($1,750,000). This initiative will provide for molecular identification based on a specific pathogen's genomic sequences

to permit building epidemiological maps and models of foreign diseases/pathogens of concern. This data will assist in determination of geographical origin important to: determine its potential for spread (e.g., modeling); improve understanding of disease prevalence; generate more accurate estimates of the economic impact of disease on production; provide the needed biological substrate to enhance microbial forensics identification supporting law enforcement activities; and use bioinformatics and genome sequence analysis and mapping to obtain new insight into microbial pathogenesis, virulence, diagnostics, prophylaxis, therapeutics, host range specificity, and identification of disease resistance genes in animal populations and control approaches. In long-term, the combination of new advances in microelectronics, computer sciences, and microbial genomics will make possible the development of unattended devices to analyze air, water, plants, and other materials on the farm, at the slaughter plant, at food/drink processing plants, and at import or quarantine stations including ports.

c) An increase of $8,000,000 for research in support of new prevention and control strategies for Emerging, Reemerging, and Exotic Diseases of Animals.

Explanation of Change.

Emerging diseases are caused by previously unidentified pathogens or new manifestations of "old" diseases that appear in animal populations. Reemergence of known diseases often occur after long quiescent periods or upon introduction of a new pathogen into a native animal population in a new geographical area. Modern efficient management practices based on intensive management practices and animal stock of narrow genetic diversity provide an environment in which there is a greater risk of severe animal disease outbreaks. In addition, the globalization of trade, increased international travel of people and movement of goods, and changing weather patterns provide new opportunities for the emergence and spread of diseases such as transmissible spongiform encephalopathies. Timely and effective control strategies are needed to maintain a safe food supply, avoid economic disruptions, and maintain consumer confidence in the ability of national governments to handle animal disease emergencies. Developing effective control strategies for animal diseases that have reservoirs in both domestic and wild animals requires a greater understanding of the mode of pathogen transmission and maintenance in alternative hosts.

Recent outbreaks of the highly virulent Newcastle disease of poultry in Australia and Mexico, and the recent foot-and-mouth disease outbreak in the United Kingdom have required destruction of huge numbers of animals to control these diseases. Immense economic losses due to domestic and international trade embargoes have resulted. The newly emerging disease of swine known as porcine reproductive disease complex (PRDC) is the most economically important infectious disease currently facing the U. S. swine industry. The origin of the disease is still in question. New research initiatives to develop methods for diagnosing and controlling PRDC are needed to enable the swine industry to eradicate this costly disease. Marek's disease, a herpes virus induced cancer like disease is one of the most economically important diseases of chickens. The field virus can evolve to greater virulence to gradually overwhelm the protection provided by current vaccines. Vaccines now available will eventually fail to protect against Marek's disease and losses from layer and breeder mortality and broiler condemnation could become catastrophic.

Research to improve rapid and accurate detection, and control emerging and or exotic pathogen threats is urgently needed to prevent economic losses and maintain animal well-being. The proposed research initiative will develop rapid, specific, and sensitive pathogen detection methods and new disease control strategies.

Scientists at the ARS National Animal Disease Center (NADC) perform multidisciplinary, state-of-the-art animal disease studies in unique facilities which provide the biocontainment required to safely work with animal pathogens, some of which are infectious for humans. These include BSL-3 level security facilities for effectively and safely conducting experiments on pathogens and diseases in target species of livestock and poultry. Located in Ames, Iowa, adjacent to the APHIS National Veterinary Services Laboratory and close to the APHIS Center for Veterinary Biologics, NADC scientists through their research programs assist APHIS by developing scientific

information on disease diagnostics, pathogenesis, management, and vaccination procedures. This research supports the development of regulatory decisions and interventions used by APHIS and State regulatory agencies, as well as providing responses to emergency situations.

Outcomes

This research initiative will provide the knowledge and the tools to maintain the health and well-being of livestock and poultry, decrease trade barriers, and rapidly respond to outbreaks of emerging and exotic animal diseases. Specifically, the research will result in more rapid and specific immunodiagnostics; improved vaccines and therapeutics against Newcastle and Marek's diseases; tools for the rapid detection and alternative methods for controlling and containing any outbreak of the highly contagious foot-and-mouth disease in livestock; and an improved understanding of the disease processes involved in PRDC.

ARS research in this initiative supports Performance Goal 2.1.1.1: Experimentally develop and demonstrate production of new, improved and alternative farm animals, crops, and horticultural products with potential for successful introduction and demonstrate successful operation of aquaculture systems; Performance Goal 2.1.3.1: Collections of well-documented germplasm of importance to U.S. agricultural security are readily available to scientists and breeders for research and development; Performance Goal 2.1.3.2: Document DNA base sequences of agricultural importance; Performance Goal 2.1.3.3: Release of improved germplasm varieties, and breeds based on effective use; and Performance Goal: 2.1.3.4: Improve methods of identifying useful properties of plants, animals, and other organisms, and for manipulating the genes associated with these properties.

Specific Program Thrusts

- **New Prevention and Control Strategies for Marek's Disease** ($1,500,000). ARS will:
  - Develop biological and molecular approaches for vaccine development that will provide greater protection and contribute to the control of the virus.
  - Use genome data to develop a new strategy for gnomic manipulation to generate the necessary vaccine candidate strains.

- **Determine the Immunopathogenesis of Porcine Respiratory Disease Complex** ($1,000,000). ARS will:
  - Determine the cellular and molecular mechanisms by which PRDC virus persists in infected swine.
  - Elucidate the precise mechanism involved in neutralizing PRDC virus.
  - Determine the role of PRDC virus in disabling macrophages needed to fight secondary bacteria.

- **Develop Sensitive Diagnostic Methods and Effective Vaccines to Control Foot and Mouth Disease (FMD)** ($2,500,000). ARS will:
  - Develop/validate rapid diagnostic tests based on the molecular structure of various strains of FMD virus.
  - Develop new vaccines to more effectively respond to emergency disease outbreaks.
  - Determine if vaccines could be engineered to match FMD strains that pose the most risk to livestock.
  - Validate tests which differentiate antibodies induced by current vaccines from those induced by field exposure.

- **Improve Vaccination Strategies Against Velogenic, Exotic Newcastle Disease in Poultry** ($500,000). ARS will:
  - Use microbiologic/modern molecular biological techniques to locate the virulence on the viral genome.
  - Provide improved diagnostic tests and vaccines as well as critical information about the molecular epidemiology of Newcastle Disease.

- **Address Emerging Diseases Offshore** ($500,000). ARS will:
  - Establish collaborations to characterize disease threats in their native areas.
  - Validate diagnostics and vaccines in native areas to reduce threats to the U.S.

- **Develop Control Strategies for Bovine Spongiform Encephalopathy and Native Transmissible Spongiform Encephalopathies (TSE)** ($2,000,000). ARS will:

- Develop and validate tests for central nervous system (brain and spinal cord) tissues, including comparative evaluation of existing tests.
- Accelerate development and validation of tests for ruminant protein feeds and other products.
- Develop improved methods to differentiate TSE types.

d) An increase of $3,950,000 for research in support of Agricultural Genomes.

Explanation of Change.

The U.S. agricultural system now faces formidable challenges such as: water and soil pollution; environmental regulations which may rapidly complicate agricultural production and processing; new pests and pathogens; and the extinction or inaccessibility of genetic resources resulting in increased genetic vulnerability of animals. These challenges can only be met by harnessing the inherent potential of genetic resources.

More rapid and efficient methods are required to characterize, identify, and manipulate the useful properties of genes and genomes. Current methods, collectively termed "genomics," rely on ever more detailed, accurate, and comprehensive knowledge of gnomic organization to efficiently characterize genes and elucidate their function. Genomics and biotechnology are critical for: improving the efficiency of production, and the quality and safety of food products from animals; improving the accuracy of genetic selection; and identifying and moving genes into livestock populations; and identifying the genes responsible for disease and parasite resistance in animals. These undertakings will be financed through coordinated initiatives in ARS, CSREES, NSF, and DOE. They support the Department's principles on food and agricultural policy by enhancing agricultural competitiveness and animal and plant health.

Gnomic and germplasm research augment traditional genetic selection providing rapid improvements in superior performance and product quality that represent permanent advances for future generations of livestock. ARS has continuing programs on gene mapping and identification in cattle, sheep, swine, poultry, and fish. Development of genetic linkage maps permits ARS to direct research efforts for mapping chromosomal regions that regulate growth, lactation, reproduction, carcass traits, and disease resistance in livestock. ARS scientists have been sequencing short pieces (300-500 bases) of genes called ESTs (Expressed Sequence Tags) for cattle, swine, and poultry that will be very useful in identifying genes affecting production traits in the previously mapped chromosomal regions. The Agency has initiated an international effort to develop a physical map of the bovine and porcine genome. This information with gnomic sequencing will be a very valuable resource for identifying genes and determining their function.

Outcomes

The proposed research will provide the means for maintaining and enhancing the quality and safety of the U.S. food supply. Agricultural competitiveness in global markets will be increased by generating data on mechanisms for disease prevention in animals; and providing a strategy for maintaining and enhancing the production, quality, and safety of animal-based food.

ARS research in these areas supports Performance Goal 1.1.3.1: Demonstrate postharvest technologies that add value and improve quality; Performance Goal 2.1.3.1: Collections of well-documented germplasm of importance to U.S. agricultural security are readily available to scientists and breeders for research and development; Performance Goal 2.1.3.2: Documented DNA base sequences of agricultural importance; Performance Goal 2.1.3.3: Release of improved germplasm, varieties, and breeds based on effective use of genetic resources; Performance Goal 2.1.3.4: Improve methods for identifying useful properties of plants, animals, and other organisms, and for manipulating the genes associated with these properties; and Performance Goal 2.1.4.1: Make technologies available for improving productivity, safety, quality, and the security of the agricultural production system.

Specific Program Thrusts

- **Identify Genes that Influence Disease Resistance, Reproduction, Nutrition and Other Economically Important Production Traits in Livestock and Poultry ($3,000,000).** ARS will:

- Map and identify genes that influence growth, nutrition (feed efficiency) and reproductive traits, disease resistance, and production traits in beef and dairy cattle, pigs, and poultry.
- Sequence genes expressed sequence tags (ESTs), and develop physical bacterial artificial chromosome (BAC) maps, single nucleotide polymorphism (SNP) markers to map the genes to chromosomes, and microarrays to determine gene expression and function.
- Develop a "rough draft" of the cattle, swine, and chicken genome.
- Conduct genomics studies in ARS laboratories to determine gene expression patterns and gene function to improve production efficiency, animal health and well-being, product quality, and enhance food safety.

- **Identify Genes in the Texas Cattle Fever Tick that Contribute to Acaracide Resistance and Host Function for Babesiosis** ($950,000).
  The genes that contribute to acaracide resistance and host function for babesiosis in the Texas cattle fever tick will be identified using existing genetic techniques. Once the genes are identified and sequenced, effective strategies will be developed for biological control and disease resistance in livestock.

e) An increase of $49,000 for the Federal Employees' Compensation Act (FECA) Program.

The FY 2003 budget will include language in the General Provisions of the Treasury – Postal Appropriations Bill to permit the Department of Labor to add an administrative surcharge to the amount it charges each agency for its FECA benefits.

f) A total increase of $4,517,000, for a total FY 2003 need of $42,641,000, for Employee Pension and Annuitant Health Benefits of which $889,000 is for Animal Sciences.

The Administration has proposed legislation to require agencies to pay the full share of accruing employee pensions and annuitant health benefits beginning in FY 2003.

g) A decrease of $1,614,000 in ongoing research programs and laboratory closures to provide savings to finance higher priority research initiatives.

The Federal Agriculture Improvement and Reform Act of 1996 mandated the establishment of a "Strategic Planning Task Force" to review all currently operating agricultural research facilities constructed in whole or in part with Federal funds, and all planned agricultural research facilities proposed to be constructed with Federal funds to ensure that a comprehensive research capacity is maintained. The Task Force incorporated its vision and its supporting principles and recommendations into a 10-year plan. As a result of site visits, laboratory reviews, reports from agencies and data reviewed, the Task Force recommended a number of laboratory closures and consolidations. These are documented in a 108 page USDA publication dated August 1999.

In response to the recommendations of the Strategic Planning Task Force, and the Administration's general policy of fiscal restraint, the President's FY 2003 Budget proposes the following laboratory closure:

-- Avian Disease and Oncology Laboratory, East Lansing, Michigan ($701,000)
The Administrative Review Scores conducted by the Task Force rated this laboratory at the bottom 10 percent of all laboratories. The Task Force recommended that this laboratory be closed and consolidated with the Southeast Poultry Research Laboratory in Athens, Georgia. The mission of the Avian Disease and Oncology Laboratory is to generate and disseminate information and provide effective leadership to solve current and future problems in neoplastic and certain viral diseases of poultry. This action will consolidate all poultry disease programs at the Athens laboratory. This will also eliminate the need for new facilities at East Lansing which are estimated at some $30 million to construct, as well as reduce administrative overhead costs at this facility by about 20 percent. This consolidation will increase the capacity of the Southeast Poultry Laboratory to carry out research on viral diseases. The East Lansing location will continue to house ARS' sugarbeet and bean research.

Also, the Task Force questioned the need for the concurrent operation of ARS' four regional utilization centers located at Albany, California; Peoria, Illinois; New Orleans, Louisiana; and Wyndmoor, Pennsylvania. These centers are currently undergoing major facilities' renovation requiring substantial dollar investments. The Task Force recommended that collaboration be increased between and among the four regional centers and consider the possible co-location and consolidation of these facilities.

-- National Center for Agricultural Utilization Research, Animal Health Consortium, Peoria, Illinois ($913,000)
This is a part of the Biotechnology Research and Development Consortia ($3,617,000 in FY 2002) which was initially funded in 1991. This grant program provides support for the development and transfer of animal health technologies to commercial companies. Terminating Federal funding will allow the industry to assume their responsibility in supporting and overseeing this applied research.

h) A decrease of $19,034,000 for the termination of Congressionally-designated projects appropriated in FY 2001 and 2002 in Animal Sciences research to provide savings to finance higher priority research initiatives.

The Fiscal Year 2003 budget recognizes the critical importance of a strong USDA research program that is flexible enough to both respond and seek out the challenges and opportunities of the 21st century, but to do it within the reality of fiscal limitations. Therefore, if we want to make the most effective use of the taxpayers' dollars, we must continually reevaluate our portfolio, and set priorities, not only at the margin but among all of our programs. For that reason, we have proposed the termination of unrequested Congressionally targeted earmarks within the Animal Sciences research program.

The projects recommended for elimination under this Objective are:

--Animal Vaccines (Greenport, NY)
--Aquaculture Initiative for Mid-Atlantic Highlands (Leetown, WV)
--Aquaculture Fisheries Center (Pine Bluff, AR)
--Aquaculture Initiatives, Harbor Branch Oceanographic Institute (Stuttgart, AR)
--Aquaculture Systems/Rainbow Trout (Leetown, WV)
--Asian Bird Influenza (Athens, GA)
--Avian Pneumovirus (Athens, GA)
--Catfish Genome Research (Auburn, AL)
--Malignant Catarrhal Fever (MCF) Virus (Pullman, WA; Dubois, ID)
--Mosquito Trapping Research/West Nile Virus (Gainesville, FL)
--National Warmwater Aquaculture Center (Stoneville, MS)
--National Center for Cool and Cold Water Aquaculture (Leetown, WV)
--Poultry Enteritis-Mortality Syndrome (Athens, GA)
--Poultry Diseases/Avian Coccidiosis/Leukosis-J Virus (Beltsville, MD)
--Bovine Genetics (Beltsville, MD)
--Broiler Production in the Mid-South (Starkville, MS)
--Catfish Health (Stoneville, MS)
--Dairy Forage (Madison, WI)
--Dairy Genetics Research/Bovine Genetics/AIPL (Beltsville, MD)
--Formosan Subterranean Termite (New Orleans, LA)
--Livestock and Range Research (Miles City, MT)
--Livestock Genome Mapping Initiative (Clay Center, NE)
--National Germplasm Resources Program/ National Plant Germplasm System (Various sites)
--Seafood Waste (Fairbanks, AK)
--Shellfish Genetics (Newport, OR)
--Stuttgart National Aquaculture Research Center (Stuttgart, AR)
--Trout Genome Mapping (Leetown, WV)
--Vaccines and Microbe Control for Fish Health/Fish Diseases (Auburn, AL)
--Poultry Diseases/Avian Pneumovirus/Coccidiosis (Athens, GA; Beltsville, MD)

OBJECTIVE 4: COMMODITY CONVERSION AND DELIVERY

1) An increase of $3,554,000 for research on Commodity Conversion and Delivery consisting of:

a) An increase of $7,142,000 which includes an increase of $3,940,000 for restoration of FY 2002 pay costs, and an increase of $3,202,000 which includes $2,084,000 for the annualization of the FY 2003 pay raise and $1,118,000 for the anticipated FY 2003 pay raise.

ARS proposes an increase of $7,142,000 for pay costs in FY 2003. While increased appropriations proposed in the President's FY 2002 Budget for pay were agreed to by the House and Senate, final Conference action dropped this essential funding. The Agency is requesting that pay costs effective in FY 2002 be restored. In addition, the President's Budget recommends funding for proposed pay costs that are anticipated in FY 2003.

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these costs reduces the number of scientists and support personnel and operating funds essential to maintain and conduct viable research programs. If funds for increased pay costs are not provided, ARS will be unable to fill some essential positions, and will have to reduce spending in all non-pay areas including laboratory equipment and supplies needed to carry out the Agency's research programs.

b) An increase of $9,000,000 for research in support of **Biobased Products and Bioenergy from Agricultural Commodities**.

Explanation of Change.

Widely fluctuating energy prices and depressed agricultural commodity prices in recent years have contributed to a renewed emphasis on expanding the use of biobased industrial products (including fuels) to improve the nation's energy security, balance of payments, environment, and rural economy. Executive Order 13134, Developing and Promoting Biobased Products and Bioenergy," was signed by the President on August 12, 1999, to stimulate the creation and early adoption of technologies needed to make biobased products and bioenergy cost competitive in large national and international markets. The Congress passed and the President signed the Biomass Research and Development Act of 2000 (Title III of the Agricultural Risk Protection Act of 2000 which became Public Law No. 106-224 on June 22, 2000), establishing a Biomass Research and Development Board to coordinate programs within and among departments and agencies of the Federal Government for the purpose of promoting the use of biobased industrial products. USDA and the Department of Energy developed joint biobased products and bioenergy initiatives for 2001 and 2002 and are working together to develop technologies and processes to increase the use of biobased products. The Biomass Research and Development Act directs this cooperation to continue. More recently, the President's national energy policy proposes to advance new, environmentally friendly technologies to increase energy supplies and encourage use of cleaner, more efficient energy. To this end, the President proposes to increase funding for renewable energy research and development programs, including the use of biomass.

ARS research is focused on the development of industrial and bioenergy products that offer the opportunity to meet environmental needs, replace imports of petroleum-based products, and expand market opportunities. The President's budget for FY 2002 included a request for $15 million for ARS in bioenergy, biomass, and biobased products. This work was funded by Congress with a $12 million increase in FY 2002, and the funds requested in FY 2003 will enable ARS to expand research in this high priority program area.

Outcomes

By expanding the development of biobased products and bioenergy, new demand can be created for agricultural commodities to strengthen farm product prices and raise farm income; open new opportunities for business development and employment growth in rural America; enhance U.S. security by reducing dependence on imported oil and other materials; and improve environmental quality by reducing air pollution and greenhouse gas emissions.

ARS research in these areas supports Performance Goal 1.1.3.1: Demonstrate postharvest technologies that add value and improve quality; Performance Goal 1.2.1.1: Experimentally demonstrate the production of new, improved, and alternate crops and horticultural products with potential for successful introduction and demonstrate the successful operation of aquacultural systems; and Performance Goal 1.2.2.1: Experimentally demonstrate improvements in processing technologies and develop new bioproducts and uses that have potential to increase demand for agricultural commodities.

Specific Program Thrusts

- **Improve the Quality and Quantity of Agricultural Biomass Feedstock for Production of Energy and Biobased Products** ($3,000,000). ARS will:
  - Conduct research to modify plant cell walls for more efficient conversion to desired products. Alternative crops, such as guayule, cuphea, and flax that will add biodiversity and sustainability of crop rotations will be developed as feedstocks for biobased products to reduce reliance on imports and improve rural economic conditions.
  - Conduct research to genetically modify biomass crops to increase production and facilitate conversion to liquid fuels and power.
  - Conduct research to develop sound and sustainable systems for producing, harvesting, and handling biomass crops for energy production.

- **Develop Technologies to Produce Biobased Products from Agricultural Commodities and Byproducts** ($3,500,000). ARS will:
  - Perform research at a molecular level to address the ways in which biopolymers and synthetics interact in material blends. Efforts will be intensified to learn how processing conditions affect the ultimate product.
  - Study combinations of polymers derived from a variety of agricultural materials. Crosslinking nonfood protein will strengthen animal fibers and products for forming functional composites.
  - Develop new biobased products with novel functional properties for applications previously unattainable or met only by petroleum derived, imported, or non-biobased materials. Selected examples include novel biodegradable polymers, absorbents, coatings, composite building materials, lubricants, surfactants, substitutes for imported gums, and chemical building blocks for industrial and consumer applications. Technologies developed for producing these products will be environmentally benign and energy efficient.

- **Improve Conversion of Agricultural Materials and Wastes to Biofuels** ($2,500,000). ARS will:
  - Expand the development and use of biobased fuels to decrease dependence on imported petroleum, increase environmental benefits, and improve rural economic stability.
  - Improve process economics by developing alternative processing technologies to create 21st century bio-refineries. ARS will also broaden the feedstock range and expand the primary product line to include higher valued polysaccharides, oils, and proteins with optimum value as well as inexpensive biofuels.
  - Develop economic enzymatic processes for breaking down biomass to its component sugars. Improved microorganisms will be genetically constructed to ferment the multiple sugars found in biomass. Researchers will develop new processing paradigms using environmentally benign bioprocesses and separation methods to prepare novel bioproducts that have commercially valuable functional properties.

c) An increase of $45,000 for the Federal Employees' Compensation Act (FECA) Program.

The FY 2003 budget will include language in the General Provisions of the Treasury – Postal Appropriations Bill to permit the Department of Labor to add an administrative surcharge to the amount it charges each agency for its FECA benefits.

d) A total increase of $4,517,000, for a total FY 2003 need of $42,641,000, for Employee Pension and Annuitant Health Benefits of which $909,000 is for Commodity Conversion and Delivery.

The Administration has proposed legislation to require agencies to pay the full share of accruing employee pensions and annuitant health benefits beginning in FY 2003.

e) A decrease of $8,519,000 in ongoing research programs and laboratory closures to provide savings to finance higher priority research initiatives.

The Federal Agriculture Improvement and Reform Act of 1996 mandated the establishment of a "Strategic Planning Task Force" to review all currently operating agricultural research facilities constructed in whole or in part with Federal funds, and all planned agricultural research facilities proposed to be constructed with Federal funds to ensure that a comprehensive research capacity is maintained. The Task Force incorporated its vision and its supporting principles and recommendations into a 10-year plan. As a result of site visits, laboratory reviews, reports from agencies and data reviewed, the Task Force recommended a number of laboratory closures and consolidations. These are documented in a 108 page USDA publication dated August 1999.

The Task Force recommended the consolidation of all ARS' small grain quality research activities currently conducted at five different locations into two facilities at Manhattan, Kansas and Pullman, Washington to eliminate similar efforts and provide for a more cost effective operation. The Manhattan and Kansas laboratories will continue to address the national priority to evaluate grain quality. The following ARS small grain research activities are proposed for closure and/or consolidation:

-- Cereal Crops Research Unit, Fargo, North Dakota ($305,000)
The mission of the Cereal Crops Research Unit is to provide knowledge and improved germplasm for developing, maintaining, and improving hard red spring wheat, durum wheat, barley, and oats. An existing project on evaluating wheat quality will be consolidated with the Grains Marketing Laboratory at Manhattan, Kansas; the remaining portion of the project is being terminated. The Fargo laboratory will continue to carry out research on genetic improvement and protection of wheat, oats, and barley. Other ARS research programs at Fargo will also continue.

-- Cereal Crops Research Unit, Madison, Wisconsin ($354,000)
The mission of the Cereal Crops Research Unit is to identify and characterize the biological mechanisms in cereal plants that affect the properties of their grain products. An existing project on the evaluation of barley quality will be consolidated with grain quality research at the Grain Marketing Laboratory at Manhattan, Kansas. The Madison laboratory will continue to carry out other research on oats and barley. Other research programs at Madison will also continue.

-- Soft Wheat Quality Research Unit, Wooster, Ohio ($583,000)
The mission of the Soft Wheat Quality Research Unit is to evaluate quality of soft wheat breeding lines and cultivars from the eastern United States and to conduct research in the physics and chemistry of wheat and flour. This ARS unit will be closed. The Wooster location will continue to house ARS' application technology and corn and soybean research laboratories.

Also, the Task Force questioned the need for the concurrent operation of ARS' four regional utilization centers located at Albany, California; Peoria, Illinois; New Orleans, Louisiana; and Wyndmoor, Pennsylvania. These centers are currently undergoing major facilities renovation requiring substantial dollar investments. The Task Force recommended that collaboration be increased between and among the four regional centers and consider the possible co-location and consolidation of these facilities.

-- Western Regional Research Center, Albany, California ($5,373,000)
WRRC conducts mission oriented research to enhance the healthfulness of foods and safety of the food supply, create new products from agricultural crops and processed co-products using biotechnology and bioengineering, and develop environmentally and ecologically sound methods for pest control for efficient food and industrial processes. ARS is proposing the termination of all processed food research currently

conducted at WRRC since major food companies are capable of carrying out similar research. Also, a current research project on crop improvement and utilization is being reduced in scope.

-- National Center for Agricultural Utilization Research, Biotechnology Research and Development Consortia, Peoria, Illinois ($1,904,000).
This program was initiated in 1987 with appropriations provided and earmarked by Congress. It supports extramural research by the Biotechnology Research and Development Consortia, a group of corporate research institutions engaged in applied research to develop efficient bioproduction systems aimed at greater diversity of agricultural product utilization. Terminating Federal funding will allow the industry to assume their responsibility in supporting and overseeing this applied research.

f) A decrease of $5,023,000 for the termination of Congressionally-designated projects appropriated in FY 2001 and 2002 in Commodity Conversion and Delivery research to provide savings to finance higher priority research initiatives.

The Fiscal Year 2003 budget recognizes the critical importance of a strong USDA research program that is flexible enough to both respond and seek out the challenges and opportunities of the 21st century, but to do it within the reality of fiscal limitations. Therefore, if we want to make the most effective use of the taxpayers' dollars, we must continually reevaluate our portfolio, and set priorities, not only at the margin but among all of our programs. For that reason, we have proposed the termination of unrequested Congressionally targeted earmarks within the Commodity Conversion and Delivery research program.

The projects recommended for elimination under this Objective are:

--Aflatoxin in Cotton/Cotton Resistant to Aflatoxin (Phoenix, AZ)
--Cotton Ginning Research (Las Cruces, NM)
--Natural Products (Oxford, MS)
--Postharvest and Controlled Atmosphere Chamber Research/Lettuce (Salinas, CA)
--Biomass Crop Production (Brookings, SD)
--Food Safety for Listeria and E. coli (Headquarters)
--Foundry Sand By-Products Utilization (Beltsville, MD/Headquarters)
--Biotechnology Research and Development Corporation (Peoria, IL)

OBJECTIVE 5: HUMAN NUTRITION

1) An increase of $335,000 for research on Human Nutrition consisting of:

a) An increase of $1,258,000 which includes an increase of $673,000 for restoration of the FY 2002 pay costs, and an increase of $585,000 which includes $381,000 for the annualization of the FY 2003 pay raise and $204,000 for the anticipated FY 2003 pay raise.

ARS proposes an increase of $1,258,000 for pay costs in FY 2003. While increased appropriations proposed in the President's FY 2002 Budget for pay were agreed to by the House and Senate, final Conference action dropped this essential funding. The Agency is requesting that pay costs effective in FY 2002 be restored. In addition, the President's Budget recommends funding for proposed pay costs that are anticipated in FY 2003.

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these costs reduces the number of scientists and support personnel and operating funds essential to maintain and conduct viable research programs. If funds for increased pay costs are not provided, ARS will

be unable to fill some essential positions, and will have to reduce spending in all non-pay areas including laboratory equipment and supplies needed to carry out the Agency's research programs.

b) An increase of $8,000 for the Federal Employees' Compensation Act (FECA) Program.

The FY 2003 budget will include language in the General Provisions of the Treasury – Postal Appropriations Bill to permit the Department of Labor to add an administrative surcharge to the amount it charges each agency for its FECA benefits.

c) A total increase of $4,517,000, for a total FY 2003 need of $42,641,000, for Employee Pension and Annuitant Health Benefits of which $149,000 is for Human Nutrition.

The Administration has proposed legislation to require agencies to pay the full share of accruing employee pensions and annuitant health benefits beginning in FY 2003.

d) A decrease of $1,080,000 for the termination of Congressionally-designated projects appropriated in FY 2001 and 2002 in Human Nutrition research to provide savings to finance higher priority research initiatives.

The Fiscal Year 2003 budget recognizes the critical importance of a strong USDA research program that is flexible enough to both respond and seek out the challenges and opportunities of the 21st century, but to do it within the reality of fiscal limitations. Therefore, if we want to make the most effective use of the taxpayers' dollars, we must continually reevaluate our portfolio, and set priorities, not only at the margin but among all of our programs. For that reason, we have proposed the termination of unrequested Congressionally targeted earmarks within the Human Nutrition research program.

The projects recommended for elimination under this Objective are:

--Barley Food Health Benefits Research (Beltsville, MD)
--Diet and Immune Function (Little Rock, AR)
--Nutritional Requirements Research (Houston, TX)

OBJECTIVE 6: INTEGRATION OF AGRICULTURAL SYSTEMS

1) An increase of $997,000 for research on Integration of Agricultural Systems consisting of:

a) An increase of $884,000 which includes an increase of $484,000 for restoration of FY 2002 pay costs, and an increase of $400,000 which includes $260,000 for the annualization of the FY2003 pay raise and $140,000 for the anticipated FY 2003 pay raise.

ARS proposes an increase of $884,000 for pay costs in FY 2003. While increased appropriations proposed in the President's FY 2002 Budget for pay were agreed to by the House and Senate, final Conference action dropped this essential funding. The Agency is requesting that pay costs effective in FY 2002 be restored. In addition, the President's Budget recommends funding for proposed pay costs that are anticipated in FY 2003.

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these costs reduces the number of scientists and support personnel and operating funds essential to maintain and conduct viable research programs. If funds for increased pay costs are not provided, ARS will be unable to fill some essential positions, and will have to reduce spending in all non-pay areas including laboratory equipment and supplies needed to carry out the Agency's research programs.

b) An increase of $6,000 for the Federal Employees' Compensation Act (FECA) Program.

The FY 2003 budget will include language in the General Provisions of the Treasury – Postal Appropriations Bill to permit the Department of Labor to add an administrative surcharge to the amount it charges each agency for its FECA benefits.

c) A total increase of $4,517,000, for a total FY 2003 need of $42,641,000, for Employee Pension and Annuitant Health Benefits of which $107,000 is for Integration of Agricultural Systems.

The Administration has proposed legislation to require agencies to pay the full share of accruing employee pensions and annuitant health benefits beginning in FY 2003.

OBJECTIVE 7: INFORMATION AND LIBRARY SERVICES

1) An increase of $2,348,000 for Information and Library Services consisting of:

a) An increase of $681,000 which includes an increase of $369,000 for restoration of FY 2002 pay costs, and an increase of $312,000 which includes $203,000 for the annualization of the FY 2003 pay raise and $109,000 for the anticipated FY2003 pay raise.

ARS proposes an increase of $681,000 for pay costs in FY 2003. While increased appropriations proposed in the President's FY 2002 Budget for pay were agreed to by the House and Senate, final Conference action dropped this essential funding. The Agency is requesting that pay costs effective in FY 2002 be restored. In addition, the President's Budget recommends funding for proposed pay costs that are anticipated in FY 2003.

Funding for pay costs is critical to maintain a national center for current agricultural information that provides timely data and information to USDA employees, researchers, students, and other library patrons. Absorption of these costs prohibits growth of the NAL collection, reduces funds available to pay for new technology, and limits NAL's ability to respond to the ever increasing demand to obtain and make available materials in electronic format and via the Internet.

b) An increase of $2,000,000 research in support of Agricultural Information Services.

Explanation of Change.

The National Agricultural Library (NAL) has a global reputation as a center of excellence in the provision of agricultural information services based on three critical resources: expert staff; comprehensive, up to date and well organized collection of printed and electronic agricultural information; and modern, specialized information and communications technology infrastructure.

The changing environment in electronic media requires NAL to develop new strategies and increased investment. New electronic versions of printed information products become available continuously, often at very high cost compared to their printed equivalents. Publishers who formerly supplied materials free of charge now require payment.

NAL produces the AGRICOLA database, the world's largest database on the literature of agriculture. The performance indicators for AGRICOLA are designed to measure improvement in the areas that users have identified as important factors: coverage, linkages to full text, presence of abstracts, and timeliness. In response to public pressure to make the AGRICOLA database available on the Internet, a "no fee" version of AGRICOLA was provided at the NAL Web site in 1998. This new service exponentially increased public access

to AGRICOLA and was praised widely. Further investment in the service is required to fully meet the needs and expectations of AGRICOLA searchers. The need to maintain a cutting edge infrastructure for AGRICOLA will grow as usage increases due to greater Internet access.

As the sole U. S. national library for agriculture, NAL will fulfill its mission by assuming a leadership role in the development of a national digital library for agriculture to bring the wealth of agriculture related information and knowledge to all users through the most advanced technologies. The ultimate goal of a national digital library is to have current agricultural information and digital archives equally accessible at all times to all customers. A variety of information resources in numerous formats are present on NAL's current Web site, the Web pages of the information centers, and the AGRICOLA gateway. These resources need to be more fully integrated and linked to facilitate ease of access and navigation between related entities.

Outcomes

Completion of the program initiatives will ensure continued progress in fulfilling NAL's strategy for modern information technologies. The volume and quality of information services will increase. More specialized collections will be developed to match the needs of the wide variety of audiences included in the NAL clientele, such as researchers, specialists, policymakers, teachers, students, and the general public, all of whom will benefit from NAL services around the clock from wherever they are. Tremendous economies of scale will reduce the unit cost of information services. Finally, the taxpayers' cumulative investment in NAL since 1862 will be leveraged by a small marginal investment to transform NAL's program into a collection of virtual information services equally available to all, rather than an unequal set of services provided only to clients with physical access to NAL in Beltsville.

NAL will build on the foundation of its electronic information initiative to create more digital resources, promote new standards for organizing and describing them, utilize leading edge discovery and access tools, and leverage existing partnerships such as AgNIC to create a Web-based National Agricultural Information Portal for the new virtual information services.

The proposed increase supports: Performance Goal 6.2.1.1: Maintain up-to-date data on customer information needs and satisfaction; Performance Goal 6.2.1.2: Integrate customer data into continuous refinement of operations; Performance Goal 6.2.1.3: Develop and improve NAL information delivery systems; Performance Goal 6.2.1.4: Develop an Agricultural Subject Headings thesaurus; Performance Goal 6.2.1.5: Increase collaboration via AgNIC (Agriculture Network Information Center); Performance Goal 6.2.1.6: Develop programs and services for previously under-served audiences; Performance Goal 6.2.1.1: Expand acquisition of information in all formats; Performance Goal 6.2.2.2: Gain space for collection growth; Performance Goal 6.2.2.3: Preserve and secure collections; Performance Goal 6.2.2.4: Increase number of records in the AGRICOLA database; Performance Goal 6.2.2.5: Increase linkages from the AGRICOLA database to electronic content; Performance Goal 6.2.2.7: Ensure systematic upgrade of equipment; Performance Goal 6.2.2.8: Ensure security of electronic data and equipment; and Performance Goal 6.2.2.9: Implement new electronic library management system with minimal disruption to customers and staff/operations.

Specific Program Thrusts

- **Develop a National Digital Library for Agriculture (NDLA)** ($1,600,000). NAL will:
  -Begin implementation of the digital library initiatives that were recommended by the 2001 Interagency Panel for Assessment of the NAL. The NDLA will be a nationwide initiative to create and supply key agricultural information in digital form. NAL will be at the center of the NDLA initiative which will be developed by NAL and its partners. The primary focus for FY 2003 will be on improved access to electronic resources, delivery of digital information to USDA customers, and archiving USDA digital publications. Outreach will begin to extend the national digital library for agriculture initiative beyond the boundaries of NAL to include partnerships with land grant universities, Federal agencies, non-profit organizations and others through the Agriculture Network Information Center (AgNIC).
  -Identify and license electronic reference tools, databases, and journal packages for USDA customers.
  -Accelerate the transformation of AGRICOLA into an index to the virtual national collection of electronic

journals, digital archives, statistical and GIS databases and images, as well as to the physical holdings of NAL by implementing cooperative indexing programs and the acquisition of publisher data.
-Continue to add to AGRICOLA the unique and historically valuable collections of digitized images that form the library's historical collections for access through the NDLA portal.
-Begin development of a strategic plan for a Department-wide preservation program that ensures permanent access to the important electronic publications of USDA.

- **Continue Development of Information Technology to Manage and Deliver Information** ($400,000). NAL will:
-Invest in new software to create and manage information, new telecommunications, and networking capabilities to deliver the information, and provide enhanced computer and information security measures to ensure access and accuracy.
-Develop new Web search interface for AGRICOLA.

c) An increase of $4,000 for the Federal Employees' Compensation Act (FECA) Program.

The FY 2003 budget will include language in the General Provisions of the Treasury – Postal Appropriations Bill to permit the Department of Labor to add an administrative surcharge to the amount it charges each agency for its FECA benefits.

d) A total increase of $4,517,000, for a total FY 2003 need of $42,641,000, for Employee Pension and Annuitant Health Benefits of which $83,000 is for Information and Library Services.

The Administration has proposed legislation to require agencies to pay the full share of accruing employee pensions and annuitant health benefits beginning in FY 2003.

e) A decrease of $420,000 for the termination of Congressionally-designated programs appropriated in FY 2002 in Information and Library Services to provide savings to finance higher priority research initiatives.

The Fiscal Year 2003 budget recognizes the critical importance of strong USDA research and library services programs that are flexible enough to both respond and seek out the challenges and opportunities of the 21st century, but to do it within the reality of fiscal limitations. Therefore, if we want to make the most effective use of the taxpayers' dollars, we must continually reevaluate our portfolio, and set priorities, not only at the margin but among all of our programs. For that reason, we have proposed the termination of unrequested Congressionally targeted earmarks within the Information and Library Services program.

The programs recommended for elimination under this Objective are:

--Animal Welfare Information Center (Beltsville, MD)
--National Center for Agricultural Law (Fayetteville, AR)

AGRICULTURAL RESEARCH SERVICE
GEOGRAPHIC BREAKDOWN OF OBLIGATIONS AND STAFF YEARS
2001 Actual and Estimated 2002 and 2003

Location	2001 Amount	2001 Staff Years	2002 Amount	2002 Staff Years	2003 Amount	2003 Staff Years
ALABAMA, Auburn	$5,602,322	45	$6,984,200	59	$4,677,800	56
ALASKA, Fairbanks	3,173,536	9	4,361,500	15	2,006,100	14
ARIZONA						
Phoenix	8,739,453	105	8,708,200	105	8,965,700	106
Tucson	3,804,242	44	3,573,900	47	2,316,900	31
Total	12,543,695	149	12,282,100	152	11,282,600	137
ARKANSAS						
Booneville	4,474,550	26	4,541,400	26	2,502,900	26
Fayetteville	1,988,101	15	1,514,500	15	1,798,000	17
Little Rock	7,747,285	5	8,139,100	8	7,911,100	8
Pine Bluff	891,781	7	937,900	7	870,600	7
Stuttgart	5,771,400	59	7,117,500	69	5,377,200	68
Total	20,873,117	112	22,250,400	125	18,459,800	126
CALIFORNIA						
Albany	29,260,651	231	31,187,400	263	28,665,400	225
Davis	8,130,492	60	8,417,500	64	8,527,900	64
Parlier	8,194,536	79	10,484,300	87	8,205,700	87
Riverside	5,133,599	45	5,003,800	47	5,341,300	49
Salinas	3,583,470	44	3,581,000	44	3,427,700	44
Shafter	998,522	13	1,052,900	13	1,052,900	13
Total	55,301,270	472	59,726,900	518	55,220,900	482
COLORADO						
Akron	1,171,232	17	1,455,400	20	1,360,900	20
Fort Collins	13,308,020	157	13,597,000	169	14,020,000	172
Total	14,479,251	174	15,052,400	189	15,380,900	192
DELAWARE						
Newark	1,477,663	18	1,344,700	18	1,479,700	20
DISTRICT OF COLUMBIA						
National Arboretum	7,813,414	98	9,486,100	104	8,684,600	104
Headquarters Federal Administration	53,575,690	514	56,582,000	514	53,082,000	486
Total	61,389,104	612	66,068,100	618	61,766,600	590

AGRICULTURAL RESEARCH SERVICE
GEOGRAPHIC BREAKDOWN OF OBLIGATIONS AND STAFF YEARS
2001 Actual and Estimated 2002 and 2003

Location	2001 Amount	2001 Staff Years	2002 Amount	2002 Staff Years	2003 Amount	2003 Staff Years
FLORIDA						
Brooksville	967,701	14	1,261,700	14	1,261,700	14
Canal Point	1,498,462	23	1,861,500	25	1,623,000	25
Fort Lauderdale	1,217,495	15	1,509,100	17	1,509,100	17
Fort Pierce	8,835,071	72	8,514,000	78	7,972,000	77
Gainesville	12,567,069	139	11,799,100	140	10,631,300	139
Miami	3,294,794	45	3,681,200	50	2,970,500	50
Winter Haven	1,660,412	15	1,727,400	15	1,727,400	15
Total	30,041,005	323	30,354,000	339	27,695,000	337
GEORGIA						
Athens	26,039,927	231	25,256,400	234	29,142,100	260
Byron	2,364,534	35	2,985,300	37	2,769,300	37
Dawson	3,222,661	38	3,426,400	38	3,426,400	38
Griffin	1,786,118	17	2,101,000	19	1,876,000	19
Tifton	7,617,055	93	9,005,100	102	7,992,900	99
Total	41,030,294	414	42,774,200	430	45,206,700	453
HAWAII, Hilo	10,986,347	72	10,154,300	75	9,466,300	75
IDAHO						
Aberdeen	3,523,885	23	3,519,800	25	3,321,800	25
Boise	1,843,650	21	2,004,000	23	2,139,000	24
Dubois	2,043,072	19	2,059,000	19	2,059,000	19
Kimberly	2,566,153	32	3,019,500	35	2,857,500	35
Total	9,976,760	95	10,602,300	102	10,377,300	103
ILLINOIS						
Peoria	30,404,736	250	34,803,300	302	32,826,500	301
Urbana	3,607,508	33	4,481,800	41	4,156,400	41
Total	34,012,244	283	39,285,100	343	36,982,900	342
INDIANA, W. Lafayette	5,677,282	48	6,701,000	54	6,480,500	54
IOWA, Ames	34,641,792	355	37,106,800	383	39,449,000	398
KANSAS, Manhattan	8,892,512	85	8,406,900	88	8,322,600	88
LOUISIANA						
Baton Rouge	2,367,556	30	2,597,300	33	941,600	15
New Orleans	25,012,998	252	27,214,000	264	26,252,000	264
Total	27,380,553	282	29,811,300	297	27,193,600	279
MAINE, Orono	1,588,570	18	1,980,100	19	--	--

AGRICULTURAL RESEARCH SERVICE
GEOGRAPHIC BREAKDOWN OF OBLIGATIONS AND STAFF YEARS
2001 Actual and Estimated 2002 and 2003

Location	2001 Amount	2001 Staff Years	2002 Amount	2002 Staff Years	2003 Amount	2003 Staff Years
MARYLAND						
Beltsville	127,248,449	1,212	127,921,300	1,252	130,321,900	1,269
Frederick	3,494,203	31	3,578,400	31	4,293,900	35
Total	130,742,652	1,243	131,499,700	1,283	134,615,800	1,304
MASSACHUSETTS, Boston	14,804,069	8	14,857,900	8	14,857,900	8
MICHIGAN, East Lansing	4,598,913	50	3,983,900	50	1,360,500	20
MINNESOTA						
Morris	2,669,619	31	2,659,400	31	2,780,900	31
St. Paul	5,325,529	46	5,571,700	49	6,705,700	56
Total	7,995,148	77	8,231,100	80	9,486,600	87
MISSISSIPPI						
Mississippi State	9,577,096	101	10,194,500	113	7,478,700	111
Oxford	10,403,902	86	11,691,400	94	9,439,600	94
Poplarville	2,438,239	23	3,145,900	29	1,824,400	23
Stoneville	24,131,537	248	29,398,600	274	23,243,000	269
Total	46,550,774	458	54,430,400	510	41,985,700	497
MISSOURI, Columbia	7,881,955	62	8,484,100	68	7,470,500	66
MONTANA						
Miles City	2,071,504	20	2,600,400	24	2,168,400	24
Sidney	4,393,307	49	3,248,600	48	3,248,600	48
Total	6,464,811	69	5,849,000	72	5,417,000	72
NEBRASKA						
Clay Center	16,045,434	134	17,716,000	149	18,917,500	156
Lincoln	4,858,137	62	5,559,100	68	6,490,600	73
Total	20,903,571	196	23,275,100	217	25,408,100	229
NEW MEXICO						
Las Cruces	4,794,254	31	5,181,500	35	2,396,900	31
NEW YORK						
Greenport	12,805,579	59	12,690,200	62	16,094,000	82
Ithaca	9,732,912	49	11,001,000	66	11,174,500	67
Total	22,538,491	108	23,691,200	128	27,268,500	149

AGRICULTURAL RESEARCH SERVICE
GEOGRAPHIC BREAKDOWN OF OBLIGATIONS AND STAFF YEARS
2001 Actual and Estimated 2002 and 2003

Location	2001 Amount	2001 Staff Years	2002 Amount	2002 Staff Years	2003 Amount	2003 Staff Years
NORTH CAROLINA						
Raleigh	6,630,608	62	6,966,100	68	7,893,100	74
NORTH DAKOTA						
Fargo	11,774,226	116	13,581,600	125	10,397,100	121
Grand Forks	8,289,845	62	8,370,700	62	8,370,700	62
Mandan	2,927,517	41	3,160,800	46	3,218,300	46
Total	22,991,589	219	25,113,100	233	21,986,100	229
OHIO						
Columbus	760,620	8	1,048,000	10	742,000	8
Coshocton	1,100,963	14	978,000	14	1,369,500	17
Wooster	4,209,477	33	4,228,500	34	2,958,900	29
Total	6,071,060	55	6,254,500	58	5,070,400	54
OKLAHOMA						
El Reno	4,761,233	58	4,939,300	61	5,254,300	63
Lane	1,791,893	26	1,727,100	26	1,727,100	26
Stillwater	2,707,702	33	2,906,300	36	2,726,300	36
Woodward	1,555,221	22	1,544,500	22	1,544,500	22
Total	10,816,048	139	11,117,200	145	11,252,200	147
OREGON						
Burns	1,427,585	10	1,551,000	12	1,146,400	11
Corvallis	8,157,345	91	8,774,500	105	8,220,100	105
Pendleton	1,722,746	22	1,629,700	22	1,571,600	22
Total	11,307,676	123	11,955,200	139	10,938,100	138
PENNSYLVANIA						
University Park	3,922,186	40	4,081,100	42	4,023,600	42
Wyndmoor	28,213,981	241	29,496,500	260	31,386,500	272
Total	32,136,167	281	33,577,600	302	35,410,100	314
SOUTH CAROLINA						
Charleston	3,312,254	35	3,117,300	38	3,112,300	38
Clemson	2,025,243	29	1,995,500	29	1,995,500	29
Florence	2,400,996	27	2,852,300	33	2,829,800	33
Total	7,738,494	91	7,965,100	100	7,937,600	100
SOUTH DAKOTA						
Brookings	2,939,502	27	2,631,300	35	1,767,300	35

AGRICULTURAL RESEARCH SERVICE
GEOGRAPHIC BREAKDOWN OF OBLIGATIONS AND STAFF YEARS
2001 Actual and Estimated 2002 and 2003

Location	2001 Amount	2001 Staff Years	2002 Amount	2002 Staff Years	2003 Amount	2003 Staff Years
TEXAS						
Beaumont	1,370,516	17	1,347,300	17	1,347,300	17
Bushland	3,663,295	34	2,801,500	35	3,427,000	38
College Station	14,065,563	146	15,041,900	157	14,168,900	155
Houston	12,947,255	10	12,661,200	14	12,281,200	14
Kerrville	3,758,941	42	3,508,200	44	3,922,200	46
Lubbock	6,292,864	72	7,746,400	86	5,632,900	84
Temple	3,450,714	44	3,167,100	44	3,257,100	45
Weslaco	8,821,668	114	9,133,300	116	10,623,300	127
Total	54,370,817	479	55,406,900	513	54,659,900	526
UTAH, Logan	5,503,011	58	5,575,400	58	5,350,900	57
WASHINGTON						
Prosser	3,301,142	33	2,988,400	33	3,446,600	36
Pullman	10,078,775	112	12,320,700	124	12,137,500	124
Wapato	3,494,265	70	3,545,600	73	3,592,200	73
Wenatchee	1,870,436	24	1,544,900	24	1,544,900	24
Total	18,744,619	239	20,399,600	254	20,721,200	257
WEST VIRGINIA						
Beaver	6,189,880	58	6,748,000	60	5,283,200	60
Kearneysville	5,980,160	69	6,205,300	70	6,046,900	70
Leetown	4,416,258	8	6,747,300	24	2,995,500	20
Total	16,586,298	135	19,700,600	154	14,325,600	150
WISCONSIN, Madison	8,377,061	63	9,485,700	81	8,083,800	76
WYOMING						
Cheyenne	2,415,557	22	2,179,400	27	1,999,400	27
Laramie	2,343,159	28	2,453,400	28	2,453,400	28
Total	4,758,716	50	4,632,800	55	4,452,800	55
PUERTO RICO						
Mayaguez	2,552,790	36	2,593,500	36	2,728,500	37
OTHER COUNTRIES						
Argentina, Buenos Aires	596,599	--	560,600	--	560,600	--

AGRICULTURAL RESEARCH SERVICE
GEOGRAPHIC BREAKDOWN OF OBLIGATIONS AND STAFF YEARS
2001 Actual and Estimated 2002 and 2003

Location	2001 Amount	2001 Staff Years	2002 Amount	2002 Staff Years	2003 Amount	2003 Staff Years
OTHER COUNTRIES (CONTINUED)						
France, Montpellier	2,461,954	4	2,542,400	7	2,434,400	7
Panama,						
Panama City	823,882	5	902,700	5	902,700	5
Total	3,882,435	9	4,005,700	12	3,897,700	12
Extramural and Funds Administered from Headquarters-Held Funds	79,469,222	--	90,062,500	--	92,303,900	--
Repair & Maintenance of Facilities	18,144,152	--	18,222,000	--	18,222,000	--
Unobligated Balance	5,868,428	--	--	--	--	--
Subtotal, Available or Estimate	965,230,649	7,934	1,020,395,000	8,518	978,717,000	8,470
Agricultural Risk Protection Act Funding for Ethanol and Waste	(17,500,000)	--	--	--	--	--
Transfer from Office of Congressional Relations	(128,716)	--	--	--	--	--
Transfer from Agency for Int'l. Development (AID)	(12,975,495)	--	--	--	--	--
Transfer from Rental Payments to GSA	(2,699,000)	--	(2,807,000)	--	--	--
Retirement/Health Pension Benefits	(34,024,000)	--	(38,124,000)	--	--	--
Miscellaneous Fees	(1,068,824)	--	--	--	--	--
FY 2001 Rescission	1,977,386	--	--	--	--	--
Pay Costs	--	--	--	--	35,369,000	--
TOTAL, Appropriation	898,812,000	7,934	979,464,000	8,518	1,014,086,000	8,470

AGRICULTURAL RESEARCH SERVICE
STATUS OF PROGRAM

ARS finances and conducts research under seven major program activities: Soil, Water, and Air Sciences; Plant Sciences; Animal Sciences; Commodity Conversion and Delivery; Human Nutrition; Integration of Agricultural Systems; and Agricultural Information and Library Services. The research carried out under these program activities is explained in the "Purpose Statement' section of the Explanatory Notes. The selected examples of recent progress are listed by the U.S. Department of Agriculture's REE (Research, Education, and Economics) mission area and ARS strategic planning goals.

Current program activities and progress under each research area are outlined below:

REE Goal 1 - Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.

Current Activities

ARS conducts research designed to enhance production systems; improve the processing quality, performance, and value of commodities; and reduce pathogen risks that constitute nontariff agricultural trade barriers. With ARS research, the national needs for scientific agricultural information are met in a timely manner so that U.S. agricultural producers and processors have access to current knowledge and technologies. Because trade issues are global, ARS collaborates with foreign research institutions. ARS research results in technologies and practices that reduce pathogen risks, encourage trade in agricultural products, and mitigate nontariff barriers.

ARS research accomplishments strengthen the competitiveness of U.S. agriculture in domestic and export markets by improving quality, value and marketability. The accomplishments include a: new diagnostic test and vaccine for foot and mouth disease, new market for soybeans, better process of sorting wheat for karnal bunt, new quarantine treatment to replace methyl bromide for walnuts and apples, new plum cultivar resistant to the plum pox virus, biocontrol agent for the papaya mealybug, pathogenic baculovirus to control caterpillar pests of cotton and corn, new test for toxoplasmosis, more "environmentally-friendly" process for dehairing hides, new line of disease resistant drybean germplasm, and a "cryopreservation" process for preserving seeds of valuable "recalcitrant" plants.

Selected Examples of Recent Progress

New diagnostic test for foot and mouth disease. ARS scientists have developed a new rapid diagnostic test, which is being validated, for detection of and response to outbreaks of agricultural diseases such as foot and mouth disease. The technology not only allows for real time detection of the disease within 120 minutes of the technician arriving onsite, but also enables the user to communicate the results over the Internet to those involved in making decisions on how to deal with such outbreaks. (Animal Sciences)

Vaccine for foot and mouth disease. Foot and mouth disease virus spreads quickly between animals resulting in devastating epidemics. The disease is normally controlled by slaughtering large numbers of exposed animals. There is great reluctance by animal health officials to use existing vaccines due to creation of carrier states, ineffectiveness of the killed vaccines, and outbreaks initiated by attenuated vaccines. ARS scientists at Orient Point, New York using a virulent field strain of the foot and mouth virus, removed part of the genes and inserted them into an adenovirus vector to create a vaccine that preliminary tests indicate can protect pigs as early as one week following vaccination. Vaccines that provide early protection to animals can help safeguard valuable national herds that are subject to a potential foot and mouth disease outbreak. (Animal Sciences)

Development of a technique to "winterize" soy-oil fuel blends for military aircraft. America's soybean farmers could reap the benefits of a whole new market--biodiesel fuel containing soy oil, blended with noncommercial

jet fuel. ARS scientists have shown that after winterizing, a biodiesel fuel that contains soy oil can be safely blended with the noncommercial jet fuel known as JP-8. Researchers developed a three-step winterization process for biodiesel fuel that involves mixing in additives, chilling the fuel and filtering out solids. The researchers added small amounts of esters from fatty acids of soybean oil to the JP-8. The winterized oil mixture did not form solid particles when exposed to a range of slightly below zero to minus 52 degrees fahrenheit in the laboratory. Biodiesel is nonflammable, making it relatively safe to store and handle, and environmentally innocuous because it's biodegradable. (Commodity Conversion and Delivery)

New test for toxoplasmosis. Toxoplasmosis is one of the most common causes of parasitic diseases in humans and animals. Swine products are a major source of *Toxoplasma gondii* infection in the U.S. ARS scientists at Beltsville, Maryland, using supplemental funding from the National Pork Producers Council, have developed a sensitive DNA test for the parasite in swine or other animal tissues. The test is so sensitive that it can identify the amount of DNA in one parasite. This test will be an important tool for protecting America's food supply, and for epidemiological investigations to decrease the numbers of swine infected with this parasite. (Animal Sciences)

Sorting of wheat kernels for karnal bunt improved. Karnal bunt disease of wheat is a threat to U.S. wheat production and exports. Its presence resulted in millions of bushels of wheat being quarantined in the United States in 2001. Scientists at Manhattan, Kansas, in cooperation with USDA/APHIS, several State labs, and Satake USA, applied high speed sorting technology developed at the Manhattan lab to rapidly remove bunted kernels from samples of wheat, thus reducing inspector error and significantly reducing sample processing time. This research resulted in a change in the procedure for inspecting samples of wheat for bunted kernels to improve the ability to control and detect additional outbreaks of the disease, thereby helping to ensure the quality of U.S. wheat and preserve export markets. (Commodity Conversion and Delivery)

New virus resistant plum trees developed. Plum trees developed by ARS researchers are virtually resistant to all major strains of plum pox virus. Also known as sharka, plum pox virus deforms or blemishes plums, peaches, apricots, and almonds, making the fruit unmarketable. Plum pox first appeared in the United States in Adams County, Pennsylvania in 1999, but has since spread to two more Pennsylvania counties, York and Cumberland. The new virus resistant trees, known now as "C5," look very similar to their female parent, a plum cultivar called Bluebyrd, that also was developed by ARS. The fruit of C5 tastes like that of Bluebyrd, too. The difference is that the C5 trees have a gene that prevents plum pox virus from multiplying in them. ARS has filed a patent on the C5 trees. (Plant Sciences)

Process for dehairing hides for tanning made more environmentally friendly. A rapid process for removing hair from a cowhide prior to separation of the hide from the carcass is being incorporated into existing slaughterhouse operations for food safety. Parameters needed to be established for such processing that minimize its impact on hide quality, while promoting safe and efficient recycling of the dehairing agent. Under a CRADA to evaluate the rapid chemical removal of cattle hair with sulfide prior to hide removal, researchers at Wyndmoor, Pennsylvania demonstrated a recycle process on a pilot plant scale with a sulfide-free effluent. The process was incorporated into a new meat packing plant which opened in the summer of 2001. Benefits of this dehairing process include: reduction of dirt- or manure-borne bacteria trapped on the hair that may infect the carcass meat, vastly facilitated inspection of hide quality, significant decreases in subsequent chemical usage by tanneries, and minimal impact on hide quality. (Commodity Conversion and Delivery)

Glue from soybeans provides new market potential. Proteins derived from animal blood are often used in plywood glues, but replacements for these proteins are needed for health and safety reasons. Using soy-based glue formulations developed by scientists at Peoria, Illinois a full scale trial was conducted at a plywood mill in Arkansas. Results indicate that the soy-based formulations gave satisfactory performance based on mixing, processing, and adhesive properties. Successful plant trials will bring the soy protein-based adhesive closer to commercialization, thus creating a substantial new market for soybeans. (Commodity Conversion and Delivery)

Enzymes reduce energy for fuel ethanol production. Producing fuel ethanol from grain requires significant

amounts of energy for cooking to convert the grain starch to glucose syrup before fermentation. Enzymes that can function effectively at lower temperatures could solve the problem. By using directed molecular evolution, ARS researchers in the Bioproduct Chemistry and Engineering Research Unit at the Western Regional Research Center in Albany, California have found new enzymes that are nearly 50 times more reactive than those currently used. Successful development of these enzymes will make possible the conversion of starch to glucose at lower temperatures (cold hydrolysis) which will improve energy efficiency and reduce the cost of fuel ethanol production. (Commodity Conversion and Delivery)

Improving the specificity of genetic engineering. In 2001, ARS reported for the first time a method for moving a randomly inserted gene into a genome at a specific site. A patent has been filed for this invention jointly with BASF, the co-inventor. In addition, ARS scientists found that another site specific transformation method is effective in a wide variety of organisms. One practical effect of site specific transformation will be to reduce unknown or unwanted genetic rearrangements that might occur during transformation. (Plant Sciences)

Cryopreservation of difficult seeds. One of ARS' prime responsibilities is to preserve germplasm in seedbanks. However, many species are "recalcitrant," or fatally injured by standard preservation techniques. In cooperation with scientists from South Africa, a device was built that cools seeds very rapidly at rates from hundreds to thousands of degrees centigrade per second. In 2001, specific combinations of seed hydration, cooling rate, and seed mass were shown to preserve seeds of some recalcitrant species that had never been done before. This breakthrough is expected to be especially valuable for seeds of many tropical fruit and temperate forest tree species. (Plant Sciences)

Alternative antibiotics for American foulbrood control found. The bacterium that causes American foulbrood disease is currently controlled by Terramycin antibiotic, the only antibiotic registered for control of this disease. However, the bacterium is showing resistance to Terramycin in some areas of the United States, so that the disease is again threatening the bee industry which is already weakened by low honey prices, and attacks of invasive mites and small hive beetles. Scientists at the Bee Research Laboratory in Beltsville, Maryland and the Beneficial Insects Research Laboratory in Weslaco, Texas demonstrated that the antibiotics Lincomycin and Tylosin are effective in controlling American foulbrood disease, and are non-toxic to immature and adult honey bees. Once registered, these antibiotics will provide an effective alternative for beekeepers. (Plant Sciences)

Biocontrol agent for papaya mealybug is proving successful. The papaya mealybug has invaded much of the Caribbean and has recently become established in Florida where it represents a serious threat to the citrus industry. In cooperation with APHIS and ARS' European Biological Control Laboratory, ARS scientists in Newark, Delaware have imported and released a parasite that is achieving up to 100 percent control of the mealybug in Florida. This research suggests that biocontrol methods may successfully control this invasive pest. (Plant Sciences)

Revolutionary system for disease surveillance and epidemic management. The recent outbreaks of foot and mouth disease virus in the United Kingdom and Taiwan highlight the devastating and far-reaching effects of foreign animal diseases. The impacts on the economy and the environment are well documented. ARS scientists, working in collaboration with the Department of Defense, have developed rapid on-site tests that detect and identify important animal, plant, and foodborne pathogens. These tests are designed for use at the farm-gate or marketplace. The system is designed to communicate real time data over the Internet to those who can take immediate action to isolate, manage, or eradicate the disease causing pathogen. Assays developed to date protect animal health (i.e., from foot and mouth disease virus and hog cholera virus), plant health (i.e., from soybean rust and Karnal bunt), food (i.e., from E.coli O157:H7, listeria, salmonella), water (i.e., from cryptosporidium) and the environment. This unique system of detection, identification, and communication will enable the U.S. to better protect its valuable animal, crop, and food resources. (Animal Sciences)

Areawide management successfully used for control of the noxious weed leafy spurge. Leafy spurge is an invasive exotic weed that infests more than five million acres of land in 35 States and the prairie provinces of Canada. It causes significant problems in the northern Great Plains by invading grazing lands for cattle and

horses, reducing rangeland productivity and plant diversity, degrading wildlife habitat, displacing sensitive species, and drastically reducing land values. ARS scientists at Sidney, Montana in partnership with other Federal and State agencies, universities, and private groups and organizations, have lead an extensive 5-year attack on this weed at four demonstration sites as part of the ARS areawide pest management program (AWPM). This program, using biological control and integrated grazing systems has resulted in an estimated 85 percent reduction in leafy spurge foliar cover at the four State demonstration sites. As a result of adoption and expansion by ranchers, the program has been instrumental in reducing the $144 million economic loss due to leafy spurge in North Dakota, South Dakota, Montana, and Wyoming, and as much as 95 percent reduction in herbicide use. (Plant Sciences)

Sampling strategy for detection of citrus tristeza virus developed. Citrus tristeza virus (CTV) is the most devastating viral disease of citrus. In central California it has been controlled by survey and eradication of infected trees. A sampling strategy that allows coverage of large areas has been developed by ARS scientists at the Horticultural Crops Research Laboratory at Davis, California and the Subtropical Plant Pathology Research Laboratory at Fort Pierce, Florida in cooperation with the Central California Tristeza Eradication Agency to optimize detection of CTV 'hotspots." This cost effective sampling procedure, which successfully identified the level of CTV infection in specific fields, is now used by growers to determine CTV incidence in new areas. (Plant Sciences)

Genetically modified seed sampling plan developed for FDA. Regulatory agencies and the grain industry need a method to evaluate the performance (buyer's and seller's risks) of sampling plans used to detect genetically modified (GM) seed in grain lots so that more accurate sampling plans can be designed. At the request of the FDA, scientists at Raleigh, North Carolina evaluated the performance of present sampling plans used to detect GM seed in grain lots for various sample sizes and the acceptance/rejection limits for detecting StarLink corn in bulk commercial grain lots. Based upon minimum risk levels specified by FDA, a sample design was developed for the FDA that requires six 400-kernel samples all test zero before lots can be accepted as having negligible GM seed. FDA guidance to the grain industry describing the sampling plan and showing levels of consumer protection associated with the sampling plan can be found on the web at http://www.cfsan.fda.gov and http://www.cfsan.fda.gov under "What's New." (Commodity Conversion and Delivery)

Disease resistant dry bean germplasm developed. Most dry edible bean cultivars lack adequate resistance to common bacterial blight, a disease of increasing importance in the major bean production regions of the United States. In response to this need, the dry bean breeding program at Prosser, Washington, has developed 14 enhanced germplasm lines to meet the immediate need expressed by private and public breeders for resistant breeding material. One black, one great northern, one cranberry, four kidney, four navy, and three pinto bean germplasm lines with enhanced resistance to common bacterial blight were released in cooperation with the ARS laboratories in Puerto Rico and Beltsville, Maryland, along with the Colorado, Michigan, Nebraska, North Dakota, and Washington Agricultural Experiment Stations. This work highlights the effectiveness of the collaboration between ARS scientists and university partners in achieving complex, common goals. (Commodity Conversion and Delivery)

ARS scientists help preserve the Star Spangled Banner. Under a CRADA with the Smithsonian Institution for the preservation of the Star Spangled Banner (SSB), scientists at Wyndmoor, Pennsylvania sought ways to characterize the flag's weave and yarn faults. Digital images of fabrics simulating the SSB fabric (e.g., a Civil War flag on loan for the project) and subsequent analyses of these images led to the development of a nondestructive digital imaging method of analysis. Data from photo images of sections of the SSB can be analyzed by the new method to establish a record of the weave and yarn faults of the SSB in deciding on preservation steps. (Commodity Conversion and Delivery)

Natural pesticides and crop protectants developed. Fungal diseases of crops cause very large economic losses from commodity postharvest spoilage. With increased regulation and banning of synthetic-based pesticides, economical methods to produce natural-based pesticides and crop protectants are desperately needed. Scientists at the Southern Regional Research Center in New Orleans, Louisiana submitted a patent application for a novel fungicidal saponin (CAY-1), purified from plant material. CAY-1 killed fungi that produce several

potent mycotoxins often found on contaminated crops, and inhibited or killed several medically important fungi. CAY-1 could be used for combating agricultural and medically important fungal pathogens. (Commodity Conversion and Delivery)

Gene associated with muscling deposition differences located. Scientists in Clay Center, Nebraska are conducting research to identify callipyge, a naturally occurring mutation in sheep that increases the rate of muscle deposition and decreases the rate of fat deposition. The mutation has been localized to a relatively small region of the sheep genome. A large amount of DNA sequencing has been performed in this region in an effort to identify the exact cause of this phenomenon. A mutation has been identified that is perfectly associated with animals with known callipyge genotypes. An assay was designed to rapidly identify the genetic status for large numbers of animals to predict the callipyge carrier status. (Animal Sciences)

Antemortem assay developed for detection of prion disease. The spread of transmissible spongiform encephalopathies (TSEs) throughout much of Europe reinforces the need to detect prion diseases in the live animal. In the past, prion diseases could only be diagnosed in necropsy specimens. This limitation was an obvious impediment to understanding and limiting TSEs including bovine spongiform encephalopathies. ARS scientists at Pullman, Washington are validating a clinical antemortem assay for scrapie, a prion disease of sheep. This assay will be invaluable for use in a successful program to eradicate this disease from the United States and around the world. (Animal Sciences)

Pond monitoring program prevents algal toxin related mortalities of channel catfish. Since 1999, algal toxins have been implicated in the death of five million pounds of channel catfish, valued at $3.5 million. In collaboration with the University of Arkansas at Pine Bluff (UAPB), ARS scientists experimentally exposed channel catfish to two commercially available cyanobacterial toxins and also monitored over 100 commercial channel catfish ponds for the presence of potentially toxin producing cyanobacteria. The laboratory studies demonstrated that the microcystin-LR toxin was not highly toxic to channel catfish as initially thought, and was probably not the toxin responsible for the channel catfish mortalities. The pond monitoring program did prevent algal toxin related mortalities of channel catfish in the monitored ponds. As a result of this work, an algal toxicosis monitoring and prevention program has been successfully implemented by the UAPB Aquaculture/Fisheries Center of Excellence. (Animal Sciences)

Underutilizing rangeland forages in a current year wastes valuable forages next year. Researchers at Burns, Oregon found that low cattle stocking rates result in uneven distribution and patchy grazing. When given a choice, cattle spent 70 percent of their time in areas grazed the previous year and avoided areas where old, dead forages had accumulated in undergrazed areas even though there was substantially more forage there (approximately 1,200 versus 450 pounds per acre). As a result, when low stocking rates are used, animals concentrate in the areas grazed the previous year to create a self perpetuating cycle that wastes forages in under grazed areas while possibly contributing to overgrazing in other areas. This cycle can be broken by clearing the old growth with intensive grazing; mechanical cutting and fire; stocking at a proper rate; and using fencing, water and supplemental feed to help ensure proper distribution each year. (Soil, Water, and Air Sciences)

New quarantine treatments to replace methyl bromide for walnuts and apples developed. Methyl bromide is scheduled to be phased out by 2005 in developed countries. Although quarantine uses are presently exempt from this ban, the exemption could be eliminated in the future. Moreover, the ban has led to production cutbacks and price increases. Methyl bromide fumigation of agricultural commodities is used around the world to prevent the spread of insect and other arthropod pests to parts of the world where they don't exist. If alternative disinfestation methods are not developed, trade will be disrupted worldwide and many markets for U.S. agricultural commodities requiring methyl bromide fumigation will be lost. Scientists at the Yakima, Washington Agricultural Research Laboratory devised a radio frequency treatment that caused 100 percent mortality of codling moth larvae infesting walnuts with no adverse effects on walnut quality. They also developed a combination treatment of heat and increased carbon dioxide which provided quarantine level disinfestation of codling moths in apples. These treatments, if approved by trading partners such as Japan will provide economical and technically feasible alternatives to methyl bromide fumigation which will allow the export of otherwise quarantined U.S. produced fruit and nuts. (Commodity Conversion and Delivery)

Tools for detection and containment of Asian longhorned beetle discovered. The Asian longhorned beetle is a $670 billion threat to U.S. forests. Scientists at Newark, Delaware proved that the beetles could disperse about one mile rather than the 100 meters as previously reported. This information has been used by APHIS, which now sets a wider containment zone for its beetle eradication program. Scientists at Beltsville, Maryland discovered a contact pheromone that will be investigated as a means to facilitate detection of the beetle and, in combination with other tools, provide additional control of this invasive pest. Progress was also made in adaptation of acoustic sensors for beetle detection in urban trees. (Plant Sciences)

New genetic tools developed for accelerating crop breeding. Breeding superior crops often requires many years because of the complicated genetic systems governing important crop traits. ARS scientists used new statistical and molecular genetic methods to detect more praidly and accurately the presence of genes governing key crop traits, and to determine much more precisely the genes' location in the genome. This research is carried out at: Charleston, South Carolina (broccoli disease resistance); Raleigh, North Carolina (soybean drought resistance, corn yield and growth factors); New Orleans, Louisiana (sugarcane hybrid purity); Starkville, Mississippi (cotton nematode resistance); Stoneville, Mississippi (cotton genetic map); Beaumont, Texas (specialty rice traits); College Station, Texas (sorghum genetic maps); Fargo, North Dakota (wheat disease resistance); Logan, Utah (range grass genetic maps); Aberdeen, Idaho (oat quality traits); Prosser, Washington (dry bean disease resistance); Pullman, Washington (chickpea and club wheat disease resistance); Albany, California (corn kernel number, thousands of wheat grain genes, potato disease resistance); Hilo, Hawaii (sugar cane quality traits); Davis, California (rice cold tolerance); Madison, Wisconsin (potato disease resistance, oat genetic maps); Ames, Iowa (soybean disease resistance, corn nutritional content); Columbia, Missouri (corn and rye genetic maps); Lincoln, Nebraska (selectable marker for sorghum transformation); Manhattan, Kansas (wheat disease traits); Beltsville, Maryland (soybean genetic maps, high-throughput markers, and disease resistance); and Washington, DC (petunia color traits). Collectively, this research provides a new set of genetic tools for a score of major and minor crops that may shorten their research and development cycle by years. Ultimately, the collective economic impact of accelerating genetic improvement in all of these crops may be billions of dollars. (Plant Sciences)

New crop germplasm and varieties developed. Superior crop varieties better adapted to environmental extremes, more resistant to pests and pathogens, providing higher yields when grown in many environments, and containing more high value products are needed. ARS scientists developed and released new crop varieties, and germplasm lines with important new genetic traits that will ultimately enable producers to maximize yields of high quality products, yet minimize chemical input, water and soil depletion, water and soil contamination, as well as production costs. This research is carried out at: Raleigh, North Carolina (food and specialty oil soybeans); Miami, Florida (novel ornamentals); Ft. Pierce, Florida (citrus rootstocks); Stoneville, Mississippi (disease resistant soybeans); Beaumont, Texas (disease resistant rice); Fargo, North Dakota (herbicide resistant sunflowers); Aberdeen, Idaho (high-quality potatoes); Prosser, Washington (disease resistant dry beans, high-quality potatoes); Pullman, Washington (disease resistant peas and wheat); Phoenix, Arizona (high-quality Pima cotton); Salinas, California (nematode-resistant sugar beets); E. Lansing, Michigan (high-quality sugar beets); Ames, Iowa (insect resistant corn); Wooster, Ohio (disease resistant soybeans); and Beltsville, Maryland (high-quality blueberries). This research will ultimately contribute billions of dollars to U.S. agriculture's profitability, and help ensure food and economic security. (Plant Sciences)

REE Goal 2 - To ensure an adequate food supply and improved detection, surveillance, prevention, and educational programs for the American public's health, safety and well-being.

Current Activities

ARS conducts research to ensure a secure agricultural production system that reduces or eliminates factors that threaten the ability of U.S. agriculture to produce sufficient food to meet the needs of consumers. ARS' research is designed to generate knowledge regarding new and improved management practices, pest management strategies, sustainable production systems, and control of potential contaminants. Food safety research seeks ways to assess and control potentially harmful food contaminants.

ARS' research accomplishments under REE Goal 2 include a: new system to control insect pests in stored grain, rapid test for Pierce's disease of grapes, new process to remove pathogens from the surface of solid foods, new technology for killing pathogens on minimally processed foods, new coatings to preserve fresh fruits and vegetables, discovery that sodium chlorate selectively kills foodborne pathogens, and a finding that there is no significant risk of *Bt* transgenic corn to monarch butterflies.

Selected Examples of Recent Progress

Removal of pathogens from food surfaces. Pathogenic bacteria may contaminate the surfaces of foods, thereby compromising the food supply. ARS scientists developed an innocuous steam vacuum process that kills bacteria on the surface of solid foods without significant loss of quality. The process can be applied to many foods including red and white meats and fish. However, it is most effective in reducing contamination in ready-to-eat foods, and fresh fruits and vegetables. (Animal Sciences)

New coatings to preserve fresh fruits and vegetables longer. New edible coatings developed by ARS scientists could help preserve fresh fruits and vegetables longer, ensuring that more of the perishable produce goes to feed the hungry rather than rotting and going into wastebins. ARS researchers have applied for a patent on the new edible coating made of food grade polyvinyl acetate. It is cheaper to use and more effective than shellac at preventing postharvest fruit decay without discoloring the fruit. The new coating preserves and protects harvested fruit, without whitening, at a considerable savings. The coating can be applied to fruits and vegetables by dipping, spraying, or brushing on. Polyvinyl acetate is a synthetic polymer that is used as an ingredient in chewing gum. It offers an attractive alternative to the currently used shellac, which can cause citrus fruits and some apples to develop "off" flavors. (Commodity Conversion and Delivery)

Monitoring decontamination of broiler carcasses. Identification and isolation on the processing line of broilers contaminated by feces and ingesta is critical to protect the consumer from a potential source of bacterial pathogens. To protect the consumer, the FSIS has a zero tolerance regulation for feces and ingesta prior to the carcass entering the chiller. Currently, inspections are conducted by trained personnel, however, there is always the potential for human error. ARS scientists have now developed an online visioning system that can detect contamination in real time. The invention, currently under patent, has the potential to provide science-based inspection of carcasses for online zero tolerance compliance. (Animal Sciences)

HACCP in red meat processing plants. HACCP systems have been introduced into red meat processing plants to assist in eliminating pathogens from the raw meat. To be effective, these preventive control systems require science-based identification of critical control points and novel intervention strategies. ARS scientists tracked in-plant contamination from incoming animal to finished carcass by E. coli O157:H7/NM strains using genetic fingerprints. The majority of the contamination was traceable to cattle within the same lot. These results provide the industry with the evidence and knowledge to direct new intervention strategies to the very early steps of individual animal processing. (Animal Sciences)

Holding pens a major risk factor for Salmonella contamination of pork. Sources of salmonella infection in market swine during transport and holding prior to slaughter must be identified in order to develop effective strategies to prevent salmonella contamination of pork and pork products. Since swine are routinely placed in holding pens at the slaughterhouse for at least two hours prior to slaughter to improve the quality of the meat, ARS scientists tested market swine, culled sows, and the holding pen environment for salmonella and other pathogens. They found that the number and variety of salmonella strains carried by the animals increased significantly while in the holding pens, thus demonstrating conclusively that holding pens pose a significant risk for salmonella contamination of pork. Holding pen management practices need to be improved to reduce salmonella. (Animal Sciences)

Sodium chlorate selectively kills foodborne pathogens. The swine and cattle industries need intervention strategies that protect animals from infection with salmonella and E. coli O157:H7. ARS research with cattle and swine demonstrated that sodium chlorate administered orally selectively kills pathogenic E coli and salmonella without harming beneficial bacteria or normal gut function. This discovery can accelerate the

development of a practical, efficacious, cost effective and commercially viable strategy that can significantly reduce concentrations of foodborne pathogens in cattle and swine, thereby enhancing the microbiological safety of beef and pork for consumers. (Animal Sciences)

New technology for killing pathogens and spoilage organisms on minimally processed food. The reduction of microbial populations on foods is vital to the safety, quality, and shelf life of minimally processed foods. ARS scientists have evaluated the utility and effectiveness of using gaseous chlorine dioxide to disinfect fresh fruits, vegetables and seeds. Used on a variety of products including lettuce, cantaloupe, strawberries and alfalfa seeds, gas phase application of chlorine dioxide showed significant promise for general industry use. (Animal Sciences)

Proteins identified in corn that inhibit infection by *Aspergillus flavus*. Methods are needed to prevent aflatoxin contamination of crops before harvest, since the presence of this toxin in even very low amounts makes foods and feeds unacceptable for animal and human consumption. ARS scientists have discovered proteins in corn kernels that probably act together to inhibit infection by *Aspergillus flavus*, the fungus that produces aflatoxin. Levels of these proteins were elevated in maize varieties demonstrating resistance to invasion by *A. flavus* in the laboratory and in the field relative to protein levels found in susceptible varieties. The identification of these resistance related kernel proteins have led to identification of the genes encoding them. With the resistance related genes identified, genetic engineering and marker assisted selection can bring about increased resistance of maize to aflatoxin contamination more rapidly, and help assure the safety of human food. (Plant Sciences)

Corn safer to eat. ARS scientists have shown that subjecting raw corn to a high temperature, alkaline cooking process could make that staple food safer for millions of people in the world. The cooking process, called nixtamalization, removes toxins called fumonisins that are produced by the fungus *Fusarium moniliforme*, which grows on corn. ARS researchers showed that nixtamalizing reduces the level of fumonisins in raw corn by about 80 percent. Fumonisins may be associated with human esophageal cancer. (Commodity Conversion and Delivery)

Productive, disease resistant new citrus rootstock developed. Thousands of acres of citrus trees are unproductive or die each year in Florida due to rootstock-related problems. A new hybrid citrus rootstock, US-812, developed by ARS scientists at the U.S. Horticultural Research Laboratory in Ft. Pierce, Florida has been studied in long term field trials in Florida and Puerto Rico. Released to growers this year, this rootstock has resistance to multiple pathogens, good fruit quality, and outstanding yield.. US-812 could be used as a longer living and more productive replacement for the five million citrus trees that become unproductive or are lost each year in Florida. (Plant Sciences)

Same day, on-site diagnosis of Pierce's disease of grapes is now possible. Pierce's disease threatens the $5 billion California grape industry. Conventional identification of the pathogen takes 10 days to 2 weeks because the organism is difficult to isolate. Delayed detection and diagnosis result in severe crop losses and possible trade restrictions. ARS scientists at the Foreign Disease Weed Science Research Unit at Frederick, Maryland developed a same day on-site portable molecular assay for the Pierce's disease bacterium. Field tests demonstrate that infected grape stock can be diagnosed within one to two hours. Growers could use the portable assay to identify infected vines before the disease spreads within vineyards. (Plant Sciences)

New integrated pest management system controls insect pests in stored grain. The prohibition of contact insecticides as well as restrictions on use of fumigants because of environmental and health concerns presents problems for controlling insects in stored grain. ARS scientists at the Grain Marketing and Production Research Center in Manhattan, Kansas, in collaboration with scientists from Oklahoma State University and Kansas State University, developed a practical areawide IPM program for stored grain. They demonstrated that sampling grain for insects using a vacuum probe provided an accurate and economical method for estimating insect density in concrete elevators. Insects were found most often in the top 40 feet of grain. Risk analysis software was developed that uses sampling estimates and an insect growth model to predict which bins should be fumigated. This system will reduce insect damaged grain, decrease the number of unnecessary

fumigations, and increase the competitiveness of U.S. grain in global markets. (Commodity Conversion and Delivery)

Rapid test for identifying screwworm. Although screwworm, a parasite of cattle, has been eradicated from the United States, other species of the screwworm fly still exist in Central and South America. Because it is difficult for inexperienced personnel to differentiate screwworm from other species of harmless flies, surveillance against reinvasion is often delayed. ARS scientists in Lincoln, Nebraska have developed a rapid, color test, an ELISA, that can rapidly identify screwworm at any of its life stages. This method, which is now being implemented, will greatly aid APHIS in preventing the reintroduction of this destructive pest into the U.S. (Plant Sciences)

Research reveals no significant risk of *Bt* transgenic corn to monarch butterflies. Corn plant varieties genetically engineered to express the *Bacillus thuringiensis* toxin to control pest insects, also known as *Bt* corn, have been commercially grown for several cropping seasons. This technology became controversial when a small study in 1999 indicated that the monarch butterfly caterpillars suffered when given no choice but to feed on milkweed leaves heavily dusted with *Bt* corn pollen. In response, ARS scientists at Ames, Iowa led a consortium of scientists from government, universities, industry and the environmental community to undertake risk assessment research that would provide a sound, scientific basis for determining what, if any, risks exist from *Bt* corn pollen to monarch butterflies. After two years of studies, laboratory and field scientists have found that monarch caterpillars are not very sensitive to pollen from most types of *Bt* corn and that caterpillar exposure to *Bt* pollen is low, thus presenting no significant risk to the insect from environmental exposure to *Bt* corn. (Plant Sciences)

Molecular biology approach to identify fungi that may produce chemicals that can be used as insecticides. More efficient direct screening approaches are needed to identify fungi with new pesticidal chemical properties for use against insect pests. ARS scientists at Ithaca, New York developed a molecular biology approach which was then used to screen insect pathogenic fungi to determine if they contained genes that could be used to produce chemicals active against insects ("polyketides"). They determined that there may be a group of polyketide genes linked to insect pathogenic fungi that may be exploited for insect management. This is the first time that such a link has been demonstrated which may ultimately help produce more efficient, environmentally friendly insecticides. (Plant Sciences)

Improved chemical analysis. Pesticides, nutrients, and veterinary drugs in foods are routinely monitored by regulatory agencies such as the FDA-CVM and FSIS. Many of the current laboratory-based chemical assays use substantial quantities of organic solvents for extraction and cleanup of extracts prior to analysis which can have a significant impact on personnel safety and waste disposal. ARS scientists using pressurized water have developed an extraction and integrated cleanup method for the selective removal of pesticides from animal tissue. The co-extraction of interfering matrix components is minimal using this method, thus allowing chromatographic and/or spectrophotometric methods to be applied to quantify the amount of pesticide in food matrices. This technology is being implemented by regulatory laboratories both for research, and routine high throughput sample analysis. (Animal Sciences)

Low cost, rapid method for detecting pesticide resistance in ticks. Cattle Fever, a serious threat to cattle, was eradicated from the U.S. during the 20th century by dipping cattle to kill the Southern Cattle Tick. The tick, however, is still widespread in Mexico where it is becoming increasingly resistant to pesticides. ARS scientists in Kerrville, Texas have for the first time identified the gene responsible for one type of resistance and developed a rapid molecular test based on amplifying it. This test is becoming a routine surveillance tool along the international border for preventing the reintroduction of cattle fever. (Animal Sciences)

Improved methods have been developed to detect pathogens in soil and manure. Pathogenic microorganisms contained in animal manure can threaten human health through contamination of fresh produce and water. Current methods to detect these pathogens in complex matrices (i.e., manure, soil, and water) are laborious, expensive, relatively insensitive, and do not provide quantitative data. Scientists from Riverside, California have developed a polymerase chain reaction (PCR) protocol for the fluorogenic multiplex detection of E. coli

O157 at very low concentrations in soil and manure samples. These methods can be used to evaluate the effectiveness of management practices for minimizing the transport and survival of this pathogen to maintain the safety of the food and water supply. (Soil, Water, and Air Sciences).

REE Goal 3 - A healthy and well nourished population who have knowledge, desire, and means to make health promoting choices.

Current Activities

ARS conducts human nutrition research that establishes the relationship between diet and health, measures food consumption patterns, and develops new methods to measure the nutrient composition of food. The outcomes of these efforts are a safe and nutritious food supply, and information that enables humans to make healthful food choices.

ARS' human nutrition research has found: American children have inadequate calcium intakes, colon cancer may be prevented or delayed by altering an individual's diet, and selenium deficiency increases the virulence of human influenza A virus. Researchers also identified new sources of vitamin K, and released a database on the risks from pesticide residues on foods.

Selected Examples of Recent Progress

Substantial portion of American children have inadequate calcium intakes. Scientists in Houston, Texas conducted research to determine the effects of low calcium intakes on children. Healthy children were given diets with low and high calcium intake to measure how much calcium they absorbed and retained in their bodies. Preliminary data showed that, when calcium intake in girls was very low, they adapted by increasing calcium absorption, however, this adaptation was inadequate to meet the deficiency associated with the low intake. This research demonstrates that a substantial proportion of American children are not receiving a healthy amount of calcium in their diet, and that the recent dietary intake recommendations for calcium are crucial to meeting bone calcium requirements. (Human Nutrition)

Women differ from men in their ability to adapt to low iron diets. Premenopausal women absorbed four to five times more iron from a high bioavailability diet compared with a low bioavailability diet. In contrast with men, their adaptation to dietary iron bioavailability was minimal according to researchers in Grand Forks, North Dakota. Concerns about iron deficiency or excess may be moderated if people are able to adapt their iron absorption to differences in dietary iron bioavailability. These findings demonstrate the benefit of diets containing lean meat and foods rich in vitamin C (known to enhance iron absorption), without excessive amounts of phytic acid (which can bind iron) from legumes, whole grains, and tea, which will enable menstruating women to meet their high iron requirements. (Human Nutrition)

Soy protein isolate (SPI) reduced incidence of chemically induced colon cancer. SPI is thought to have important health benefits, many of which are not clearly defined. Researchers in Fayatteville, Arkansas studied the effects of SPI, a form of protein used widely in foods and in formula that is fed to 25 percent of infants. The researchers induced colon cancer in rats and found that SPI reduced the incidence of chemically induced colon cancer by 80 percent. If animal data results can be translated to people, then it is conceivable that a diet can be developed to prevent or delay colon cancer. (Human Nutrition)

Selenium deficiency increases the virulence of human influenza A virus. Researchers in Beltsville, Maryland, in collaboration with researchers at the University of North Carolina, showed that virulence of a mild strain of human influenza A virus is increased in mice deficient in selenium. The increased virulence was accompanied by 29 changes in the gene for the virus matrix protein, a region of the viral genome that is usually thought to be quite stable. These findings could have significant implications for practical public health and theories concerning the effects of nutrition on viral gene structure and function. (Human Nutrition)

Supplemental Children's Survey results released. A compact disk (CD-ROM) was released which includes the dietary and related sociodemographic data of the respondents, as well as survey instruments, documentation, and technical support data files. Dietary intake data were collected from 5,600 children from birth through nine years of age in response to the Food Quality Protection Act of 1996. The release of the CD-ROM and data tables give researchers and educators access to survey results and methodology for use in various programs and public policy decisions. The database was developed with EPA for risk assessment for dietary exposure to pesticide residues. (Human Nutrition)

New sources of vitamin K identified. ARS scientists analyzed approximately 500 representative foods from different food groups for two forms of vitamin K as part of the National Food and Nutrient Analysis Program. This is the first time that numerous foods, including certain mixed dishes, snack foods, berries, and sauces, have been identified as potentially important dietary sources of vitamin K. These data will be incorporated into the USDA Nutrient Databank System, the most widely used nutrient database. (Human Nutrition)

Increased nutritional and storage characteristics of pecans. Increases in the oleic fatty acid content of pecan kernels would greatly improve their nutritional value and storability. Genetic studies conducted by ARS scientists at College Station, Texas demonstrated that the proportion of this fatty acid in pecan kernels is genetically controlled. Carden, a wild pecan with high oleic fatty acid content, was used in crosses with Pawnee, an extremely high quality pecan that is very popular with growers throughout the world. From this family of progeny clones, it should be possible to develop a high quality pecan cultivar with enhanced nutritional value due to its elevated proportion of oleic fatty acid. (Human Nutrition)

New method for folic acid measurement in foods. Using a stable isotope dilution technique, researchers in Beltsville, Maryland developed and tested a method for measuring folic acid in a variety of fortified foods. Their research establishes a quantitative liquid chromatographic mass spectral procedure for the determination of a specific folate vitamer in foods. This method may be used to help resolve questions regarding compliance with the Federally mandated folic acid food fortification program. (Human Nutrition)

Nutrient shown to correct a fundamental age related change in an immune cell. Dysregulation of the immune response is the most significant and reproducible age related change reported across all species. Researchers in Boston, Massachusetts showed that T lymphocytes from old mice exposed to vitamin E showed significant increases in the ability of naive cells to progress through multiple cell cycles. T lymphocytes exhibit the most dramatic age related changes. This is the first time that a nutrient has been shown to correct a fundamental age related change in T cells. This finding may have significant implications for improving the overall health status of the aged by improving immune function. (Human Nutrition)

New findings on age dependent risk for developing osteoporosis. Induction of the vitamin D receptor in an in vitro cell model was shown to alter calcium transport response to vitamin D. These in vitro observations made by ARS researchers demonstrate that physiologically relevant differences in vitamin D receptor concentrations in intestinal cells result in important changes in the effects of vitamin D on gene expression and physiological function. Age dependent changes in vitamin D receptor expression may influence calcium absorption and balance, and possibly the risk of developing osteoporosis. (Human Nutrition)

Novel zinc transporters identified. Researchers in Albany, California have identified and characterized two novel zinc transporters that are important for zinc to move across intracellular membranes in mammalian cells. These may be the primary targets for dietary zinc regulation. Zinc is an essential element that plays important roles in DNA synthesis, antioxidant defense, and gene expression regulation. The risk of inadequate zinc intakes is a common public health problem affecting nearly half of the world's population. (Human Nutrition)

REE Goal 4 - To enhance the quality of the environment through better understanding of and building on agriculture's and forestry's complex links with soil, water, air, and biotic resources.

Current Activities

ARS seeks to enhance the quality of the environment through a greater understanding of agriculture's complex links with soil, water, air, and biotic resources. The scientific program in natural resources and sustainable agricultural systems involves multidisciplinary research to solve problems arising from the interaction between agriculture and the environment. New practices and technologies are developed to conserve the Nation's natural resource base and balance production efficiency and environmental quality. ARS collaborates with foreign researchers to address global environmental problems.

ARS' research accomplishments under REE Goal 4 include: new methods to reduce phosphorus pollution from manure, improved water quality from new technologies for assessing soil salinity, new processes to detect E. coli H7:0157 in manure and water, a biological control agent for saltcedar, improved treatment methods for phosphorus management in swine wastewater, and the identification of compounds that cause objectionable waste odors.

Selected Examples of Recent Progress

New method to detect E. coli H7:O157 developed. While most E. coli strains are not harmful, E. coli H7:O157 is a pathogen that can be fatal while other strains can cause diarrhea in humans. Current methods for detecting pathogens in environmental samples (i.e., manure, soil, plants, and water) are laborious , expensive and relatively insensitive. ARS scientists in Beltsville, Maryland have developed a new methodology for the quantitative detection of E. coli H7:O157 in water and manure, and distinguished and quantified it from non-harmful E. coli at less cost and less time. These improved detection methods for E.coli will enable human and animal health to be better protected. (Integration of Agricultural Systems)

Treatment methods have been developed for improved phosphorus management in swine wastewater. When manure application is based on a crop's nitrogen requirement, phosphorus in excess of crop needs can be transported to surface waters resulting in eutrophication. ARS' scientists from Florence, South Carolina in cooperation with North Carolina State University have developed a swine wastewater treatment system where phosphorus is precipitated and recovered. Removal of phosphorus from the waste stream results in recovery of solid phase phosphorus that can be used as a feedstock for production of high value fertilizers. In addition, the treatment system improves liquid/solid separation, prevents ammonia volatilization, and kills pathogens. The technology can be used to retrofit animal lagoons or in systems where the lagoon is omitted. The system is currently being evaluated on a 4,360 swine farm in North Carolina's Duplin County as part of the Smithfield Foods/ North Carolina Attorney General agreement to replace current lagoons with environmentally superior technology. (Soil, Water, and Air Sciences).

Biological control agent for saltcedar. ARS scientists released Chinese leaf beetles from cages in Texas and Colorado as the first biological control agents turned loose in the environment to do battle against saltcedar, an invasive tree that infests more than one million acres along western waterways. In addition to crowding out native plants, saltcedar can increase soil salinity, divert natural streamflow, and increase wildfire frequency. USDA and cooperating scientists are watching the beetles closely to ensure their establishment and evaluate their impact, population growth, and safety. The biological control is expected to slowly reduce saltcedar, allowing beneficial plant and animal species to reestablish in severely infested areas. (Plant Sciences)

Phosphorus pollution from manure can be reduced by use of water treatment and industrial wastes. Research at Beltsville, Maryland showed that the soluble phosphorus from manure and composts, which is most likely to cause water quality problems, can be tied up and prevented from getting into water by treating the manure with residuals left over from the treatment of water for drinking and/or industrial by-products containing calcium, aluminum, or iron. Phosphorus from manure has been identified as a major threat to water quality. Thus, the blending of different potential "wastes" produces a final product that can be used more beneficially in agriculture than the original materials. Potential water quality problems are prevented when byproducts from other sources are utilized to produce a higher value soil amendment. (Soil, Water, and Air Sciences)

Reducing phosphorus supplementation of dairy cattle will improve profitability and environmental quality. Excessive accumulation and runoff of phosphorus are major environmental concerns when manure is applied to croplands. A survey of farms by ARS scientists at Madison, Wisconsin found that dairy producers frequently feed excess supplemental phosphorus because of a current myth that dairy cattle must be fed above recommended levels to prevent the loss of milk production and poor reproduction. Research at the U.S. Dairy Forage Research Center showed that the recommended level easily met the needs of animals for milk production and reproduction without using phosphorus from bone. The research also estimated that reducing phosphorus supplementation to recommended levels would save U.S. dairy producers $100 million annually in direct costs and reduce by 60 percent the number of farms where the amount in manure exceeds the phosphorus used by crops. (Soil, Water, and Air Sciences)

Odors and ammonia emissions from waste sites determined. Because of the lack of data, developing solutions to atmospheric emissions such as odors (which is the cause of most complaints by the public) and ammonia (from human and animal waste treatment facilities) is challenging to operators, producers, and regulators. ARS researchers in Beltsville, Maryland, using micrometeorological instrumentation and gas sensors over swine lagoons, found that most of the nitrogen evolved as benign dinitrogen gas and not as ammonia (5 percent). Key odorous chemicals (i.e., sulfides, amines, and volatile fatty acids) were measured in a wastewater treatment plant where it was determined that continuous monitoring at key points in the treatment process can be used to predict the "odor potential" of the final biosolids. Use of quantitative data such as these will provide scientifically based regulations and solutions to atmospheric emissions from waste treatment facilities. (Integration of Agricultural Systems)

Identification of compounds associated with objectionable waste odors. Initial steps were achieved in defining key compounds perceived as objectionable by the general public. ARS scientists in Ames, Iowa have demonstrated a strong relationship between a number of organic compounds and odor perception by a human panel. Identification of these key compounds can now be used to determine the impact of diet modification and treatment of waste on the production of odor from swine facilities. (Soil, Water, and Air Sciences)

Newly available technology indicates that ammonia is a small proportion of total emissions from confined animal feeding operations (CAFOs). In contrast with previous and current estimates of ammonia emissions from CAFOs and current assumptions that most or all emissions are in the form of ammonia, independent measurements of nitrogen transformation and transport indicated that only 10 percent, 5 percent, and 2 percent of emissions were of the ammonia form from housing, lagoons, and fields, respectively. Other measurements showed that lagoons were significant converters of ammonium to nitrogen gas and that, at 43 percent, this conversion accounted for the largest component of fed nitrogen. If these indications of ammonia emmissions by CAFOs withstand further scientific scrutiny, a major revision may follow in development of the national air quality regulatory approach and the development of State implementation plans in regard to fine particulate matter (2.5 micrometers dimension and smaller). (Soil, Water, and Air Sciences)

Ozone is an air quality component that affects agriculture in various ways. It has long been known that excessive levels of atmospheric ozone have a yield-depressing influence on many crops. Now, it has been shown that residues of crops subjected to excessive levels of ozone decompose at a much slower rate than residues from crops not exposed. Decomposition of soybean leaf residues from plants treated with ozone was 45 percent to 60 percent slower than residues from plants grown in ozone-free air. This information is valuable in the context of evaluating crop fields for their erodibility, as well as providing further knowledge on how ozone affects agriculture. (Soil, Water, and Air Sciences)

Regional measurement of surface hydrology can be incorporated into water resource forecasts. ARS scientists in Beltsville, Maryland, leading a team of NASA, NOAA and university researchers, developed satellite-based technologies for measuring and mapping soil moisture and evapotranspiration, both critical elements of hydrologic and atmospheric processes. Using the soil moisture, evapotranspiration, snow pack, and land surface roughness measurements obtained from the microwave, thermal, Light Detection and Ranging (LIDAR), and optical remote sensing instruments, a limited number of point measurements were successfully scaled up to regional estimates. The research demonstrated that timely assessments of weather and droughts

can be achieved to benefit managers of agriculture and municipal water supplies. (Soil, Water, and Air Sciences)

Forested buffer zones can be harvested for wood products and still reduce agrochemical pollution of water resources. Total maximum daily nutrient load assessments of the Suwanne River Basin of Georgia and Florida have indicated a need for nitrogen nonpoint source pollution reduction caused by agriculture. Forested lands adjacent to agricultural fields have been shown to reduce nitrogen concentration of water moving from the fields to adjacent streams and waterways. Scientists at the Southeast Watershed Research Laboratory in Tifton, Georgia have determined that forested zones bordering agricultural fields can be harvested for lumber, fuelwood, or pulpwood and still function as filters for groundwater nitrate reduction. This indicates that these forested areas can be managed with long-term strategies to provide wood products or biofuels while maintaining water quality. (Soil, Water, and Air Sciences)

Elevated carbon dioxide concentrations alter rangeland plant communities. Using open-top chamber methodology, researchers in Ft. Collins, Colorado found that grasses growing on the shortgrass prairie respond differently when carbon dioxide levels are doubled. Needle-and-thread grass (*Stipa comata*) increased growth significantly while two other dominant grasses, western wheatgrass (*Pascopyrum smithii*) and blue grama (*Bouteloua gracilis*) did not respond. Blue grama is a prized grass because of its ability to adapt to harsh environments and its high forage value for wildlife and livestock. As the concentrations of carbon dioxide in the atmosphere continue to increase, the displacement of blue grama by other grasses could adversely affect the long-term ability of the shortgrass prairie ecosystem to support a variety of animal populations. (Soil, Water, and Air Sciences)

The Crop Rotation Economic and Environmental Impact Decision Aid (CREEDA) simultaneously calculates the costs and impacts of implementing conservation practices. Decisionmaking tools are needed to help farmers and conservation planners choose the most economical farming practices that comply with legislated standards intended to improve natural resource quality. CREEDA is being developed by ARS researchers in Corvallis, Oregon, in collaboration with NRCS and other ARS researchers to help producers evaluate conservation practices, such as no tillage, pesticide use reduction, and straw utilization instead of burning. Results from nine years of research at three long-term grass seed production cropping sites showed that seed yields were maintained; soil, water, and air quality were enhanced; and the grass seed crop was less costly to produce using these conservation practices. These results and others are being used to develop CREEDA which will provide support to Northwest producers to enable them to comply with Federal and State environmental regulations, and improve natural resources and profits. (Integration of Agricultural Systems)

Cover crops and conservation tillage increase natural enemies of insect pests and promote soil and water quality. More permanent, cost effective, and environmentally harmonious technologies are needed for pest control and natural resource conservation to reduce offsite effects and a continuous reliance on pesticides. The year round use of cover crops and other habitat management procedures together with conservation tillage was found to increase the early season abundance and effectiveness of natural enemies of crop insect pests as well as decrease soil erosion and improve soil and water quality. More sustainable farms will result from this type of whole systems approach to crop, pest, and soil management using ecological principles. (Soil, Water, and Air Sciences)

Soil saving and more profitable conservation tillage systems are being adopted by cotton producers. Cotton is grown on 1.1 million acres of highly erodible degraded soil in the Southeastern U.S. ARS researchers at Auburn, Alabama are working with researchers from the Alabama Agricultural Experiment Station, specialists with NRCS, and private sector agribusiness to conduct research and outreach activities on no-till and other conservation tillage practices. Increased transfer of the improved conservation tillage technologies to growers, consultants, extension agents, and NRCS staff has resulted in adoption rates of soil and site specific conservation practices exceeding 70 percent in the largest cotton producing counties in the region. These soil specific conservation systems not only decrease soil erosion, but also improve the profitability of Southeastern farms. (Soil, Water, and Air Sciences)

Cover crops reduce water loss, herbicide use, and enhance nutrient uptake. The extent of crop yield reduction due to land degradation is estimated to be as much as 50 percent on at least 50 percent of the land in semi-arid, subtropical climates. Legume cover crops in Southern Texas were effective in reducing water loss from evaporation, reducing the use of herbicides for weed control, and increasing nutrient uptake into plants. Cotton productivity increased from about 2.25 bales per acre without a cover crop to about 2.75 bales per acre with a cover crop. Weslaco, Texas researchers demonstrated cover crops are a best management practice that can improve farm profits, soil quality, and crop productivity. (Integration of Agricultural Systems)

Plants can be used to mine valuable trace elements from soil. Certain plant species can take up large amounts of metals (hyperaccumulator plants) without causing harm to the plant. Growing these plants on contaminated soils or those with a high natural content, an element can exist in biomass that can be used as an ore source. Field tests of a prototype nickel phytoextraction technology using Alyssum murale and Alyssum corsicum resulted in biomass with 2 percent nickel on a dry matter basis with yields over 15 tons per hectare. The biomass can be burned to generate energy, and the nickel can be recovered from the ash. Growth of nickel hyperaccumulator plants in high nickel content soils of the Northwestern U.S. could provide producers an annual income of $1,000 per hectare. This phytomining agricultural technology can also help meet the Nation's strategic needs for nickel, since all nickel mines in the U.S. have closed. (Soil, Water, and Air Sciences)

Tools for rapid mapping of soil salinity have been developed. Sustainable agriculture requires a knowledge of the spatial distribution of non-point source pollutants, such as salts and trace elements. A number of practical, field-scale salinity assessment techniques based on rapidly measuring the salinity of the soil with both direct contact four-electrode sensors and non-invasive electromagnetic sensors have been developed. Predictions of salt loading at field scales and larger have been reliably ascertained using a Geographic Information System (GIS), spatial statistics, non-invasive mobile salinity measurement equipment, and a model of salt movement in soil. This GIS-linked salt transport modeling approach provides a means of preparing regional scale maps showing predicted areas of salt accumulation in soil and drainage water. The first large-scale, salinity mapping effort is being conducted for the Lower Colorado River Basin by ARS researchers at the Riverside, California U.S. Salinity Laboratory in cooperation with water districts and government agencies. These maps can be used as an information tool to reduce the future detrimental impact of salinity on soil and water resources. (Soil, Water, and Air Sciences)

Confidence is boosted for projecting crop yields in response to increasing atmospheric carbon dioxide concentration. Studies of crop responses to increasing carbon dioxide in the atmosphere have been conducted at various locations using different experimental methods which have led to uncertainties about crop yield projections. An ARS scientist at Phoenix, Arizona, along with international collaborators, analyzed reports from experiments conducted around the world over the last decade with Free-Air Carbon Dioxide Enrichment (FACE) and compared the results with those obtained from experiments in which chambers were used. Generally, the magnitude of the growth and other responses varied among crop types, water, and nitrogen status. However, except for lower rates of water vapor loss from plant leaves and greater stimulation of root systems in FACE-grown plants, the relative responses to elevated carbon dioxide were consistent between FACE and chamber-based experiments. This finding shows that field experiments conducted with different methods lead to similar conclusions, which increases confidence in projecting the direct effects of elevated carbon dioxide on crop yields in assessments of future agricultural productivity. (Soil, Water, and Air Sciences)

Impacts of global change on plants have implications for human health. To date, most agriculturally oriented assessments of the influence of changes in global climate and atmospheric composition have focused on crop yields, however, ARS researchers are demonstrating the potential for plant responses to affect human health. ARS scientists at Beltsville, Maryland demonstrated that relatively mild increases in temperature or severe drought during seed development increased the amount of Vitamin E, an antioxidant phytonutrient in soybean seeds. Experiments found that pollen production by common ragweed is enhanced by increasing the levels of carbon dioxide. Production of more pollen by ragweed may affect not only weed ecology, but also worsen symptoms of allergy sufferers. These studies show that assessments of the impact of global change on

agriculture need to consider effects on crop quality and non-crop plants in agricultural systems, in addition to crop yield. (Soil, Water, and Air Sciences)

Improving nitrogen fixation in legumes to reduce fertilizer inputs. Improving nitrogen fixation and phosphorous acquisition in legumes would reduce the need for artificial fertilizers. High inputs of fertilizer, which also increase the risks of water pollution and reduces profitability, are among the most costly inputs in agriculture. One strategy for reducing fertilizer inputs is to increase the efficiency of nitrogen fixation in legumes so they can be used more effectively to conserve and improve the soil. Researchers at St. Paul, Minnesota found that malic acid produced by alfalfa facilitates nitrogen fixation. They then isolated the malic acid synthesis gene and found by over expressing this gene in the plant, the efficiency of nitrogen fixation can be significantly increased. These plants also accumulated phosphorus more efficiently. Transferring this malic acid enhancement approach to other legume crops, such as peas and beans, could increase the economic and conservation benefits of including alfalfa and other legume crops in crop rotations. (Soil, Water, and Air Sciences)

Best management practices for no-till, spring wheat cropping systems developed. Winter wheat-fallow systems in the Pacific Northwest are characterized by winter annual grasses, soilborne diseases, poor soil quality, and highly erosive fields. There are no best management practices for spring cropping systems in the Pacific Northwest. ARS scientists with the Land Management and Water Management Conservation Research group in Pullman, Washington and university collaborators completed five years of research on continuous no-till spring cereal crops to develop best management cropping systems. They showed that the systems would nearly eliminate downy brome populations, significantly reduce chemical inputs, increase standing stubble, and decrease soil losses compared to the winter wheat fallow system. This research will enable innovative growers to adopt a profitable system on two million acres in Washington State alone. (Plant Sciences)

Biological control of melaleuca with released weevil is proving successful. The Australian tree *Melaleuca quinquenervia,* which was introduced into Florida in 1886, has escaped cultivation and caused serious environmental damage from massive seed production in southern Florida. ARS scientists at the Invasive Plant Research Laboratory in Ft. Lauderdale, Florida released in 1997 the first biological control agent for melaleuca, a shoot attacking weevil (*Oxyops vitiosa*). The weevil has reduced seed production by over 90 percent at release sites in just four years which has also limited further melaleuca invasion into pristine natural areas. This biological control program for melaleuca is reducing expensive and temporary alternative chemical and mechanical control methods, and has an excellent possibility of controlling the weed. (Plant Sciences)

Eurasian watermilfoil and hydrilla control in California improved. Eurasian watermilfoil and hydrilla are major invasive weeds that reduce native plant biodiversity, promote other invasive species, and create monocultures of undesirable vegetation. ARS scientists in Davis, California determined that short lived herbicides were effective in controlling these weeds in lakes with minimal environmental impacts. This finding is important because there are very few herbicides approved for use in aquatic systems. Federal, State and private natural area managers now have available a proven technology to help manage infestations of these invasive weeds. (Plant Sciences)

REE Goal 5 - Empower people and communities, through research-based information and education, to address the economic and social challenges of our youth, families, and communities.

Current Activities

ARS conducts research to identify new crops, products, technologies, and practices which increases profitability, expands markets, adds value, and makes small scale processing capabilities available in rural communities. Access to technologies and information is expanded and simplified so that ranchers and rural residents can obtain information in a timely manner.

ARS' research accomplishments under REE Goal 5 include a: new wind-electric water pumping system for rural communities, crop sequence calculator decision aid to better manage crop associated risks, expert system to manage irrigated peanut production, novel approach to increasing small farm profitability, and a new effective treatment for controlling cockroaches.

Selected Examples of Recent Progress

Wind-electric water pumping is as reliable as utility powered systems. For many rural areas, some form of pumping is required to lift water from a well or stream to provide a reliable and safe supply of water for livestock. In some areas, electric utility power is not available. An ARS engineer with the Energy, Soil, and Animal Waste Resources Research Unit in Bushland, Texas designed a wind-electric water pumping system and found that the system operated maintenance free for three years while supplying water from a 280 foot well for 75 beef cattle. The findings showed that this new wind-electric water pumping system can be as reliable as utility powered systems. (Animal Sciences)

Enzyme for pesticide resistance in German cockroaches found. German cockroaches, a serious pest in food preparation areas, are especially difficult to control because they have evolved a wide variety of means to detoxify pesticides. ARS scientists in Gainesville, Florida have discovered and chemically characterized a unique, membrane bound enzyme from cockroaches that protect them from a wide range of insecticides. This discovery opens the way not only to developing kits for rapidly detecting certain types of resistance but for developing new categories of effective pesticides. (Animal Sciences)

A study to assess the quality of pond effluents. The EPA is currently developing nationally applicable discharge standards for aquaculture. ARS scientists in Stoneville, Mississippi conducted a study to assess the quality of pond effluents when ponds are drained and determine magnitude of "in-stream" processing of wastes discharged. When ponds are drained, the initial flush of discharged water consists of pond water and a slurry of sediment that has accumulated around the drain structure inside the pond. The initial discharge is very high in solids, oxygen demand, and nutrients. However, 5 to 10 minutes after the initial discharge, the effluent quality is identical to the bulk pond water for the remainder of the draining period. Therefore, a significant fraction of the total material released when a pond is drained is discharged with the first few percent of the total water volume. Although the material is associated with a relative heavy solids fraction, all of it is removed by settling within 200 meters as the effluent flows through vegetated drainage ditches. (Animal Sciences)

Increasing cattle twinning frequency for higher profitability of small farms. Cows pregnant with twins require intensive management and have increased nutritional requirements. These needs can best be met in beef herds of 150 cows or less (i.e., small herds) where labor is underutilized. Especially suited to twinning are small, seasonal, grain farms. Such farms frequently utilize the beef cattle herd as a way to add value to grain produced on the farm, and to utilize excess human labor during the winter and early spring months. A long-term genetic selection study is being conducted by ARS scientists in Clay Center, Nebraska to increase reproductive efficiency of beef production by increasing the frequency of fraternal twin births. Twinning rate in the study herd in the past year exceeded 50 percent compared to approximately 2 percent in unselected herds. Cows producing twins weaned 70 percent more calves than did cows with single births, resulting in nearly a 50 percent increase in total weaning weight per cow calving. (Animal Sciences)

Increasing small farm profitability of cows by supplementing pasture with corn. Thousands of farms across the South raise beef cattle on Bermuda grass pastures that decline in nutritional value in the late summer. As a result of this energy deficiency, producers are not able to increase the weight of their cattle and were forced to sell them. Researchers in Booneville, Arkansas evaluated using corn to supplement stocker steers on pasture and found that two pounds of corn per day per animal increased average daily gain by 26 percent; three pounds by 42 percent; and five pounds by 40 percent. Economic analysis showed that three pounds per day provided the best net return. The increased rates of gain allows producers to keep cattle on the farm longer and add value before the animals are sold in the fall. (Animal Sciences)

Crop Sequence Calculator decision aid allows producers to better manage risks. Agricultural producers need information relevant to their crop systems to successfully manage risk. The Crop Sequence Calculator allows producers to input expected crop prices and loan deficiency payments for calculation of potential returns of ten different crops (i.e., wheat, barley, sunflower, canola, soybean, pea, bean, flax, crambe, and safflower). This computer program also contains information on crop production, plant diseases, weed management, crop water use, and soil management to aid producers in their evaluation of management risks associated with different crop sequences. Since its release in mid-January 2001 by ARS in Mandan, North Dakota over 2,300 copies of this user friendly decision aid have been distributed to producers, commodity groups, seed companies, extension agents, and financial institutions to help them determine the most profitable crops at a level of risk acceptable to them. (Integration of Agricultural Systems)

Irrigator Pro Version 1, an expert system to manage irrigated peanut production, was released through a CRADA with the Peanut Foundation. Water is the single most constraining resource that affects peanut yields, quality, and producer profits. Irrigator Pro is part of a suite of expert systems modules [e.g., harvesting (HARV PRO), curing (PECMAN), marketing (MNUT), production (PRO), and whole farm planning (PNTPLAN)] developed at Dawson, Georgia. Producers using Irrigator Pro experienced higher yields, grades, and profits, with no aflatoxin contamination while minimizing the application of water and pesticides. The expert systems have reduced peanut production costs by one third and enhanced U.S. competitiveness in the world market. (Integration of Agricultural Systems)

REE Goal 6 - Management Initiative -Ensure and enhance worldwide access to agricultural information through the programs of the National Agricultural Library.

Current Activities

Through the programs and services of the National Agricultural Library (NAL), ARS ensures that agricultural information essential to the Nation is acquired, organized, disseminated, and preserved for current and future use and that advances are made in improving access to such information through the application of modern information technologies. NAL's work is related to ARS goals and performance measures in extension, outreach, education, library services, and higher education.

NAL's accomplishments include: an increase in the number of transactions to 30 million; the development of new Web sites on food safety, organic food production, and animal welfare; expansion of the Agriculture Network Information Center (AgNIC); growth of the AGRICOLA database; and preservation of rare documents including NAL's Agent Orange Collection.

Selected Examples of Recent Progress

AGRICOLA database grows to more than four million records. NAL produces the AGRICOLA (AGRIculture OnLine Access) database, the world's premier finding aid in the field of agriculture. Over 106,000 indexing records, abstracts, and cataloging records were added to AGRICOLA in FY 2001 resulting in the database surpassing the four million record milestone. More than 7,700 linkages from AGRICOLA citations to the electronic form of full text research information, databases, and images were created, dramatically reducing the time between identification and retrieval of these key information resources. (Agricultural Information and Library Services)

Information service delivery continues to grow. The Library's total volume of direct client services grew to almost 30 million transactions in FY 2001, an increase of 30 percent from the previous year largely as a result of increased use of its Web-based products and services. (Agricultural Information and Library Services)

Agriculture Network Information Center (AgNIC) expanded. The Agriculture Network Information Center (AgNIC) continues to expand its subjects covered and number of partners. In January 2001, AgNIC accepted its first Spanish language partner, SIDALC (Agricultural Information and Documentation System for America). This partner brings in Latin American and Caribbean agricultural resources. In June, two more partners joined AgNIC, the National Center for Agricultural Law Research Institute (NCALRI) and Southwestern Missouri State University. The AgNIC partners met at NAL in March 2001. The Food and Agriculture Organization participated in this meeting which laid the groundwork for potential collaborative projects for development of standards and vocabulary. Work continues on completing the second generation system and designing a new calendar database. (Agricultural Information and Library Services)

Digital desktop library initiative launched. In partnership with USDA agencies, the Library began an initiative to reduce costs and expand access for commercially published electronic information products within USDA by licensing them for worldwide multi-agency access. As consolidated contracts are put into place, significant economies of scale are expected to reduce costs for agencies that formerly managed separate licenses, while previously unaffordable products are expected to become available. (Agricultural Information and Library Services)

NAL plays leadership role in cross-governmental Web portals. The Library is playing a leadership role in the development of http://www.science.gov , a new cross-agency portal developed under the aegis of the FirstGov initiative by an alliance of twelve Federal agencies. The site is expected to be launched early in 2002. The Library has also been responsible for leadership and content development of http://www.invasivespecies.gov and http://www.nutrition.gov . (Agricultural Information and Library Services)

Web-based NAL products and services expanded. NAL continues to emphasize expanding its presence on the Web in order to provide broader access to information for its global clientele on a 24 hour per day, seven days a week basis. Recognition of NAL Web sites as quality sources of information on emerging and critical issues continues to grow. New resources created by NAL includes:

--Organic Food Production Web Site. This Web site, http://www.nal.usda.gov/afsic/ofp/, includes information about organic food production with links to pertinent publications from the Alternative Farming Systems Information Center, USDA agencies, organizations, and other Web documents. New content, including pre-1942 documents, and a database will be developed as funds allow. (Agricultural Information and Library Services)

--Animal Welfare Information Center Web Site. Spanish publications are being added to this site, http://www.nal.usda.gov/awic/pubs/awicpubs.htm, as a result of collaborations with a variety of organizations. Three of the projects were completed with the University in Nuevo Leon, Mexico. This site was included in the OpenHere.com. index and search engine. It is considered one of the 10 largest index and search sites on the Internet, and one of the most selected since its audience is largely children and families. (Agricultural Information and Library Services)

–The Food Safety Research Information Office (FSRIO) Web site, http://www.nal.usda.gov/fsrio/, was created in support of the National Food Safety Program. A key component of the Web site is a database of food safety research projects. The database is a resource for researchers and administrators to assess food safety research needs and priorities thereby minimizing duplication of effort. FSRIO was established in accordance with Section 615 of Public Law 105-185, the Agricultural Research, Extension and Education Reform Act of 1998. (Agricultural Information and Library Services)

--Americans with Disabilities Act (ADA) finding aids were added to the NAL Web site. ADA compliance provides enhanced access to Web content for visually impaired users. Special Collections posted two finding aids (indexes to the content of manuscript collections) to the NAL Web site, providing access to a wealth of resources previously available only in the Abraham Lincoln Building. Four additional finding aids in compliance with the ADA were prepared for posting on the Web. (Agricultural Information and Library Services)

More digital information resources accessible. The Water Quality Information Center has created a prototype Web service, the Database of Online Documents Covering Water and Agriculture. This site, http://www.nal.usda.gov/wqic/wqdb/esearch.html, currently contains almost a thousand titles and provides unique access to documents because of the special assignment of data tags (metadata) and keywords which improve retrieval of the pertinent materials. (Agricultural Information and Library Services)

Collection reviewed for preservation needs. The NAL Special Collections staff reviewed the preservation needs of over 10,600 linear feet of manuscript and rare book collection material. Approximately 1,000 linear feet of oversize material was rehoused, increasing its lifespan and allowing improved access. Four hundred very fragile volumes from NAL's general collection were rehoused in custom boxes to prevent further physical damage. (Agricultural Information and Library Services)

Rare documents digitized and preserved. Access to two rare volumes is greatly enhanced as a result of the digitization of Erwin F. Smith's writings on peach yellows (uniquely held by NAL) and Jean François Durande's extremely rare *Notions Elémentaires de botanique.* Erwin Smith's manuscript, which was very fragile, was professionally conserved and microfilmed prior to scanning. (Agricultural Information and Library Services)

Unique collection on Agent Orange made accessible. NAL Special Collections began digitizing the contents of the *Alvin L. Young Collection on Agent Orange.* Unique material on the development, use, and effects of dioxin and related compounds will be accessible via the Web and preserved electronically. A portion of the digitized collection will be used by the U.S. Air Force for Agent Orange related research. (Agricultural Information and Library Services)

Historic papers were acquired on USDA/ARS research in parasitology, which began in the early 1890s. The *Records of the U.S. National Parasite Collection* document research processes as well as significant accomplishments throughout the 20th century. They also illustrate the wide impact of USDA's contributions to parasitology and closely allied fields of science. (Agricultural Information and Library Services)

AGRICULTURAL RESEARCH SERVICE

Proposed Language Changes

The estimates include appropriation language for this item as follows (new language underscored; deleted matter enclosed in brackets):

Buildings and Facilities:

For acquisition of land, construction, repair, improvement, extension, alteration, and purchase of fixed equipment or facilities as necessary to carry out the agricultural research programs of the Department of Agriculture, where not otherwise provided, [$118,987,000] $16,580,000 to remain available until expended (7 U.S.C. 2209b): Provided, That funds may be received from any State, other political subdivision, organization, or individual for the purpose of establishing any research facility of the Agricultural Research Service, as authorized by law.

[For emergency expenses to respond to the September 11, 2001 terrorist attacks on the United States, for "Building and Facilities" $73,000,000, to remain available until expended, to be obligated from amounts made available in Public Law 107-38.]

AGRICULTURAL RESEARCH SERVICE

Lead-Off Tabular Statement

BUILDINGS AND FACILITIES - CURRENT LAW

Appropriation Act, 2002	$118,987,000 *
Budget Estimate, 2003	16,580,000
Increase in Appropriation	-102,407,000

*The 2002 supplemental in PL 107-117 in the amount of $73,000,000 for emergency response is excluded.

AGRICULTURAL RESEARCH SERVICE

SUMMARY OF INCREASES AND DECREASES - CURRENT LAW
(On basis of appropriation)

Facilities	2002 Estimated	Changes	2003 Estimated
Arizona: U.S. Arid Land Agricultural Research Center, Maricopa	$8,400,000	-$8,400,000	--
California: Western Regional Research Center, Albany.	3,800,000	-3,800,000	--
Western Human Nutrition Research Center, Davis	5,000,000	-5,000,000	--
District of Columbia: U.S. National Arboretum	4,600,000	-1,600,000	$3,000,000
Hawaii: Pacific Basin Agricultural Research Center, Hilo	3,000,000	-3,000,000	--
Idaho: Advanced Genetics Laboratory, Aberdeen	500,000	-500,000	--
Illinois: National Center for Agricultural Utilization Research, Peoria	6,500,000	-6,500,000	--
Iowa: National Animal Disease Center, Ames.	40,000,000	-40,000,000	--
Kansas: Grain Marketing and Production Research Center, Manhattan	3,000,000	-3,000,000	--
Maine: Northeast Marine Cold Water Aquaculture Center, Orono/Franklin	3,000,000	-3,000,000	--
Maryland: Beltsville Agricultural Research Center, Beltsville	3,000,000	+1,180,000	4,180,000
Abraham Lincoln National Agricultural Library, Beltsville	1,800,000	+5,600,000	7,400,000
Minnesota: Cereal Disease Laboratory, St. Paul	300,000	-300,000	--
Mississippi: Horticultural Laboratory for Gulf Coast, Poplarville	800,000	-800,000	--
National Biological Control Laboratory, Stoneville	8,400,000	-8,400,000	--

Facilities	2002 Estimated	Changes	2003 Estimated
New Mexico: Jornada Experimental Range Management Research Laboratory, Las Cruces	475,000	-475,000	--
New York: Plum Island Animal Disease Center, Greenport	3,762,000	-1,762,000	2,000,000
Oklahoma: Southern Plains Range Research Station, Woodward	1,500,00	-1,500,000	--
Pennsylvania: Eastern Regional Research Center, Philadelphia	5,000,000	-5,000,000	--
South Carolina: U.S. Vegetable Laboratory, Charleston	4,500,000	-4,500,000	--
South Dakota: Northern Grain Insects Research Laboratory, Brookings	850,000	-850,000	--
Utah: Poisonous Plant Research Laboratory, Logan	5,600,000	-5,600,000	--
West Virginia: National Center for Cool and Cold Water Aquaculture, Leetown	2,200,000	-2,200,000	--
Wisconsin: Cereal Crops Research Laboratory, Madison	3,000,000	-3,000,000	--
Total Available	118,987,000	-102,407,000	16,580,000

Project Statement - Current Law
(On basis of appropriation)

	2001 Actual	2002 Estimated a/	Increase or Decrease	2003 Estimated
	AMOUNT	AMOUNT		AMOUNT
Total Obligations.....	$55,943,000	$79,573,000	+2,176,000	$81,749,000
Unobligated Balances:				
Available Start of Year.....	-108,459,000	-126,553,000	-39,414,000	-165,967,000
Available End of Year.....	126,553,000	165,967,000	-65,169,000	100,798,000
Total Available or Estimate.....	74,037,000	118,987,000	-102,407,000	16,580,000
FY 2001 Rescission	163,000			
Total Appropriation	74,200,000			

a/ Excludes obligations totaling $51,000,000 from supplemental PL 107-117 for emergency response.

AGRICULTURAL RESEARCH SERVICE

JUSTIFICATION OF INCREASES AND DECREASES--BUILDINGS AND FACILITIES

A total of $16,580,000 for Buildings and Facilities, consisting of:

a) An increase of $4,180,000 for the restoration of damaged facilities at the Henry A. Wallace Beltsville Agricultural Research Center, Beltsville, Maryland.

Explanation of Change. The Beltsville Agricultural Research Center (BARC) was established in 1910. Current land resources total 6,582 acres which accommodate approximately 800 buildings and structures in support of ARS research programs. The programs include Natural Resources and Environmental Sciences, Plant Sciences, Livestock and Poultry Sciences, and Human Nutrition. The staff at Beltsville totals about 1,500 employees, including 320 scientists.

BARC is the largest agricultural research center in the world in terms of program scope and concentration of scientists. It has long had a prominent worldwide image in the agricultural sciences because of its history of research quality, contributions to agriculture, and prominent scientists. In addition, other Federal and State agencies such as the Food and Drug Administration, Animal and Plant Health Inspection Service, National Aeronautics and Space Administration, Patuxent Wildlife Research Center, Departments of State and Treasury, Agricultural Marketing Service, and the University of Maryland have offices or laboratories either at BARC or in facilities located adjacent to the Center.

On September 24, 2001 BARC suffered $20 million in damage to its facilities and equipment as a result of a tornado. This damage included roofing, landscaping, windows, mechanical equipment, greenhouse destruction, interior space, etc. BARC has begun repairing and replacing damaged facilities using a combination of agency Repair and Maintenance and Buildings and Facilities funds. In FY 2002, ARS plans to use $3 million in appropriated funds to repair or replace facilities damaged by the tornado. Funds are needed in FY 2003 to continue with the restoration of facilities.

In FY 2003, ARS is requesting $4.18 million to continue restoration efforts at BARC, specifically greenhouse restoration and replacement.

b) An increase of $2,000,000 for the modernization of the Plum Island Animal Disease Center, Greenport, New York.

Explanation of Change. The Plum Island Animal Disease Center (PIADC) is located on a Federally owned 840 acre island located about two miles from the eastern tip of Long Island. Established by an Act of Congress in 1948, the former Fort Terry facility complex was transferred to USDA from the Department of Defense.

The center is a unique national and hemispheric resource where ARS conducts state-of-the-art research, and APHIS performs diagnostic work on foreign animal diseases that are an ongoing threat to U.S. livestock. Plum Island is the only site in the U.S. authorized by Congress where research can be carried out on foot and mouth disease and other highly contagious animal diseases. There are no alternative Federal or non-Federal mainland sites available with adequate biocontainment facilities to conduct this research.

In FY 2001, ARS received $7 million for ongoing facility modernization projects. In FY 2002, ARS has received $3.762 million. Specific projects to be addressed in FY 2002 include: coastal erosion control measures ($1.5 million); construction debris site clean-up ($500,000); and miscellaneous small projects/contingencies to support modernization ($1.762 million).

In FY 2003, ARS is requesting $2 million for miscellaneous small projects/contingencies to support modernization. APHIS is requesting $3.193 million in FY 2003.

c) An increase of $7,400,000 for modernization of the **Abraham Lincoln National Agricultural Library,** Beltsville, Maryland.

Explanation of Change. The Abraham Lincoln National Agricultural Library (NAL) built in 1968 is located in Beltsville, Maryland. It is one of four national libraries and the largest agricultural library in the world. The library houses a collection of more than 3.2 million items in 50 different languages which have been accumulated from all parts of the world. It serves as a national resource for information on agriculture and related sciences. Information contained in the printed collection is disseminated through bibliographies, loans, photocopies, and reference services to agricultural colleges and universities, research institutions, government agencies, agricultural associations, industries, scientists, farmers and ranchers, and the general public. Electronic information is widely disseminated via the World Wide Web.

The building has two principal components totaling over 315,000 g.s.f.: a tower consisting of fourteen floors and a penthouse which is connected to an expansive two-story wing. A basement containing mechanical equipment located below grade covers the entire building footprint.

The Library structure has undergone several modifications in its 30 year history. In recent years, new transformers and chillers were installed, the elevators renovated, a fire protection system installed in parts of the building, mechanical equipment replaced, and a new roof membrane installed. However, in spite of systematic maintenance, systems that were new in 1968 have now exceeded their 20 to 25 year life expectancy and are becoming unreliable and require replacement.

In 1991, NAL completed a comprehensive facility condition study that identified numerous code, mechanical, electrical, and architectural deficiencies. The total cost to correct these deficiencies was estimated at nearly $18 million. However, escalating costs and inconsistent funding have increased the costs to correct the deficiencies to almost $32 million. NAL also needs to convert existing personnel space to storage space for expanding Library collections. The first phase of this modernization has been accomplished. Currently, plans for the relocation of existing functions from the fourth to the first floor area are well underway, thereby making needed stack space available for collection storage. This consolidation effort will be accomplished in two phases.

In FY 1998, $2.5 million was received for the First Floor renovation. In FY 1999, $1.2 million was received for the Phase 1 air handling unit replacement. In FY 2001, ARS received $1.77 million for Fourth Floor renovations and mechanical, electrical, plumbing, and life safety renovations. In FY 2002, ARS received $1.8 million to continue addressing major electrical distribution deficiencies.

ARS is requesting $7.4 million in FY 2003 to continue addressing major facility deficiencies. Specific projects to be addressed include: $500,000 for design (Phase 3 ground floor/first floor renovation, replacement of bathrooms and domestic water piping, and replacement of the baseboard heating system); and $6.5 million for construction to complete upgrading of the electrical distribution system, and Phase 2 of the ground floor/first floor renovation. Construction costs include an allowance for Federal procurement socioeconomic programs. In addition to the large projects, NAL is requesting an additional $400,000 in FY 2003 to cover minor miscellaneous projects and provide a contingency fund for unforeseen construction costs.

d) An increase of $3,000,000 for modernization of the **U.S. National Arboretum,** Washington, D.C.

Explanation of Change. The U.S. National Arboretum (USNA) was created by an Act of Congress in 1927 as a center for research and education in the plant sciences. Since 1959, the Arboretum has also been open to the public as a display and show area for ornamental plant materials, as well as continuing to function as a center for research and education.

The Arboretum is located in northeast Washington, D.C. on a 446 acre tract less than three miles from the

Capitol and the White House, with acceptable access to major transportation routes. In 1927, the location was a rural section of Washington, but since then the area surrounding the Arboretum has developed industrial centers, high density housing, and heavily traveled roadways. The Arboretum has become a green oasis in an otherwise intensely developed metropolitan area. Its proximity to many tourist attractions and ease of access offers countless educational opportunities for residents of the city and the estimated 28 to 36 million who visit Washington, D.C. each year.

Because of aging, many of the major Arboretum building systems--heating, ventilating, air conditioning, electrical, roofs, and infrastructure (i.e., paving, fences, and steam and water lines)--have either reached or surpassed their useful life expectancy. Other facility deficiencies involving safety and health needs must also be corrected. Cost estimates have been made to upgrade the facilities to present day standards.

In FY 2000, ARS received $500,000 for design of a new entrance from Bladensburg Road. In FY 2001, ARS received $3.33 million for design of the Administrative Building modernization, and design and replacement of lateral irrigation lines. In FY 2002, ARS received $4.6 million to complete design of the Administration Building modernization and the Bladensburg Road entrance, and to design and construct the first of several phases of the greenhouse modernization project.

In FY 2003, ARS requests $3 million for the following projects:

Greenhouse Complex Renovation. In FY 1994, ARS completed a facility study of the Greenhouse Complex which was built in 1959. In general, the facility was found to be structurally adequate but deficient in all other aspects including poor HVAC system controls. There is also a need for additional space for the curator's, maintenance, and staff offices. The study recommended that renovations be accomplished in several phases at a total cost of $5.2 million. Phase 1 has been completed. ARS received $3.63 million in FY 2002, to complete the design phase and continue construction on the first of several phases. In FY 2003, $1.3 million is requested to complete construction of the remaining phases. This includes an allowance for Federal procurement socioeconomic programs.

Hickey Run Stream Restoration. Hickey Run is a small tributary of the Anacostia River which drains on approximately 700 acres of developed and paved urban land, and deposits petroleum and hydrocarbon pollution as well as trash and debris onto the Arboretum grounds.

A storm water management design for Hickey Run was completed in October 1999 using $48,000 in EPA and ARS funds. The study determined the underlying cause of water quality degradation in Hickey Run to be from sources upstream of the Arboretum. The study called for supporting the implementation of a pollution abatement program for the Hickey Run watershed. The study also provided numerous recommendations to reduce the pollution entering the Arboretum by constructing racks to intercept trash and debris flowing into the Arboretum; installing absorbent booms to intercept petroleum and hydrocarbon pollution; removing and replacing the concrete walls along Hickey Run between Hickey Lane and the sanitary sewer crossing; repairing the sanitary sewer where it crosses Hickey Run; inspecting the entire sewer line which crosses the Arboretum property; constructing two ponds on Hickey Run to control erosion of the stream banks, improving the aesthetics of the area, providing an education avenue for aquatic plant exhibits and collections; and stabilizing the tributaries which discharge into Hickey Run.

In FY 2000, the EPA awarded a contract to the Center for Watershed Protection to study current technologies and commercial products to address the trash and oil removal requirements. That study will be completed in the first quarter of FY 2002. In FY 2001, the District of Columbia transferred $498,900 to ARS to address the Hickey Run concerns. Following completion of the EPA study, the $498,900 will be used to design and construct the trash removal system. In FY 2003, ARS is requesting $1.7 million for the planning, design, and construction of the stream restoration. This includes an allowance for Federal procurement socioeconomic programs.

Agricultural Research Service
Status of Construction Projects as of December, 2001

Status of research facilities authorized or funded in prior years and reported as uncompleted in the 2002 Explanatory Notes, is as follows:

NOTE: Design criteria, provided by ARS, specifies the program requirements for the facility and forms the basis for negotiation of architect-engineer contracts. Diagrammatic drawings or concept drawings provide the basis for the 1st review of the architect's design. Tentative drawings or architect's design are provided by the architect for firming up cost estimates and basis for developing the completed, and final working drawings.

Location and Purpose	Year	Amount of Funds Provided	Description
Arizona, Maricopa	1995 Planning	$ 396,000	Planning and design of the replacement facility is fully
U.S. Water Conservation	1999 Planning	500,000	funded. Pre-design completed in 1st Quarter of
Research and Western Cotton	2000 Planning and Design	1,400,000	FY 2002. Design to be completed in 3rd Quarter of
Research Laboratory	2001 Construction	4,989,000	FY 2003.
	2002 Design and Construction	8,400,000	
	Total	$ 15,685,000	
California, Albany	1994 Planning and	$ 1,161,000	Modernization of the North Wing is complete. Design for
Western Regional	Construction		the multi-phase modernization of the Research and
Research Center	1995 Construction	919,000	Development Facility is scheduled for completion in the 3rd
	1996 Design	2,600,000	Quarter, FY 2002. Construction for Phase 1 of the 5-Phase
	1997 Construction	4,000,000	project was awarded in 1st Quarter, FY 2002. $3.8 million
	2001 Construction	4,889,220	appropriated in FY 2002 for construction of Phase 2.
	2002 Construction	3,800,000	
	Total	17,369,220	
California, Davis	1998 Planning and Design	$ 1,700,000	Pre-design and design contract was awarded in the 2nd
Western Human Nutrition	1998 Construction	3,500,000	Quarter of FY 2000 for completion by the 3rd Quarter
Research Center	1999 Construction	6,150,000	of FY 2002. $5 million appropriated in FY 2002 to restore
	2000 Construction	9,000,000	project to original scope of 49,000 GSF. Construction
	2002 Design and Construction	5,000,000	contract is scheduled for award in the 2nd Quarter of
	Total	25,350,000	FY 2003.

Status of Construction Projects as of December, 2001 (cont'd)

Location and Purpose	Year	Amount of Funds Provided	Description
District of Columbia			
U.S. National Arboretum	2000 Planning and Design	$ 500,000	Design for the renovation of the Administrative Building is fully funded and will be awarded in the 2nd Quarter of FY 2002. The extension of irrigation system lateral lines into the collections and research plots, including installation of an automated controls system, is fully funded. Planning and design of the headhouse/greenhouse facility will be awarded in the 2nd Quarter, FY 2002. ARS is requesting $3 million in FY 2003 for renovations to the Greenhouse Complex and Hickey Run Stream.
	2001 Design & Construction	3,322,674	
	2002 Design & Construction	4,600,000	
	Total	8,422,674	
Georgia, Athens	1992 Planning	$ 400,000	Existing project has been on hold in the last few years. A feasibility study to consolidate ARS research on avian viral diseases at this laboratory was submitted to Congress in FY 2001. The proposed consolidated facility would require a substantially larger laboratory in the 120,000 to 140,000 GSF. range.
Southeast Poultry Research Laboratory	1993 Construction	677,000	
	Total	1,077,000	
Hawaii, Hilo	1999 Planing and Design	$ 4,500,000	Pre-design is scheduled for completion in the 4th Quarter of FY 2002. Design contract is scheduled for award upon signature of lease agreement with the University of Hawaii.
U.S. Pacific Basin Agricultural Research Center	2000 Construction	4,500,000	
	2001 Construction	4,989,000	
	2002 Construction	3,000,000	
	Total	16,989,000	
Idaho, Aberdeen	2002 Planning and Design	$ 500,000	Design is fully funded. Pre-Design/Design scheduled for award in 3rd Quarter of FY 2002.
Advanced Genetics Laboratory			

Status of Construction Projects as of December, 2001 (cont'd)

Location and Purpose	Year	Amount of Funds Provided	Description
Illinois, Peoria	1992 Planning	$ 1,825,000	Construction of Segment 3 (final segment) of the Pilot Plant renovation is scheduled for completion in the 2nd Quarter, FY 2002. Design of the Central Wing modernization is complete. $6.5 million appropriated in FY 2002 for Phase 1 of the 4-Phase project. A construction contract for Phase 1 will be awarded in the 3rd Quarter, FY 2002.
National Center for	1993 Planning	1,545,000	
Agricultural	1996 Construction	3,900,000	
Utilization Research	1997 Construction	1,500,000	
	1998 Construction	8,000,000	
	1999 Construction	8,200,000	
	2000 Design	1,800,000	
	2002 Construction	6,500,000	
	Total	33,270,000	
Illinois, Urbana			
Plant Physiology and	2000 Planning and Design	$ 400,000	Design and construction of new greenhouse complex is fully funded. Design is scheduled for completion in the 2nd Quarter of FY 2002. Construction is scheduled for award in the 4th Quarter, FY 2002
Genetic Research			
Laboratory	2001 Construction	3,592,080	
	Total	3,992,080	
Iowa, Ames			
National Animal	2001 Design & Construction	$ 8,980,200	Total modernization of this joint ARS/APHIS animal facility is projected at $430 million under the accelerated plan. Assuming a justification for other than full and open competition is approved, a design contract for the Large Animal BSL-3Ag facilities is scheduled for award in the 2nd Quarter, FY 2002.
Disease Center	2002 Design and Construction	40,000,000	
(NADC)	2002 Construction (Supplemental)	50,000,000	
	2002 APHIS Contribution (Supplemental)	14,081,000	
	Total	113,061,200	
Kansas, Manhattan	1995 Planning	$ 950,000	Construction of Phases 1 and 2 of the 4-phase project was completed in the 2nd Quarter of FY 2001. The construction of Phases 3 and 4 is partially funded.
Grain Marketing and	1996 Construction	1,000,000	
Production Research	1997 Construction	500,000	
Center	1999 Construction	1,400,000	
	2000 Planning and Design	100,000	
	2001 Construction	3,492,300	
	2002 Construction	3,000,000	
	Total	10,442,300	

Location and Purpose	Year	Amount of Funds Provided		Description
Louisiana, New Orleans	1992 Construction	$ 1,950,000		The modernization of the Chemical Wing is complete.
Southern Regional	1993 Planning and	1,651,000		Construction of Phase 1 of the Industrial Wing is scheduled
Research Center	1994 Construction	2,667,000		for completion in the 1st Quarter of 2002. Construction of
	1995 Construction	2,934,000		Phases 2A and 2B of the 9-phase modernization will be awarded
	1996 Construction	900,000		in the 2nd Quarter, FY 2002.
	1998 Design	1,100,000		
	1999 Modernization	6,000,000		
	2000 Modernization	5,500,000		
	Total	22,702,000		
Maine, Orono	2001 Design	$ 2,494,500		Design for the new facility is fully funded. Pre-design contract for
N.E. Marine Cold Water	2002 Construction	3,000,000		the new facility is scheduled for award in the 2nd Quarter of FY 2002.
Aquaculture Center	Total	5,494,500		Land purchase for the Franklin, ME laboratory site is in progress.
Maryland, Beltsville	1988 Design & Construction	$ 5,750,000		Ongoing Projects:
Beltsville Agricultural	1989 Design & Construction	6,100,000		1995 Funds:
Research Center	1990 Design & Construction	9,860,000		Construction:
(BARC)	1991 Design & Construction	15,999,792		-Construction of Building 004 modernization which was
	1992 Design & Construction	16,000,000		delayed because of fire is scheduled for completion in
	1993 Design & Construction	13,547,000		the 2nd Quarter of FY 2002.
	1994 Design & Construction	19,700,000	**	
	1995 Design & Construction	3,960,000		1998 Funds:
	1996 Design & Construction	8,000,000		Design:
	1997 Design & Construction	4,500,000		- Feed Center was completed in the 4th Quarter, FY 2001.
	1998 Design & Construction	3,200,000		
	1999 Design & Construction	2,500,000		
	2000 Design & Construction	13,000,000		
	2001 Design & Construction	13,270,740		
	2002 Design & Construction	3,000,000		
	Total	138,387,532		

**Appropriated under USDA Rental Payments Account

Location and Purpose	Year	Amount of Funds Provided	Description
Maryland, Beltsville (cont'd)			1999 Funds: Design: -Design for the new Poultry Production Facility is scheduled for completion in the 4th Quarter, FY 2002. 2001 Funds: Design: - Design of Building 307 modernization was awarded in the 1st Quarter of FY 2002. Construction: - Construction of Phases 1 & 2 of the Beltsville Human Nutrition Research Center is scheduled for completion in the 4th Quarter of FY 2003. 2002 Funds: Design: - Design of tornado damage repairs is scheduled to be awarded in the 2nd Quarter, FY 2002. 2003 Budget: $4.180 million is requested in FY 2003 for continuing restoration of damaged facilities, including greenhouses, roof repairs, and other facility and equipment needs.
Maryland, Beltsville National Agricultural Library	1998 Design & Construction 1999 Design & Construction 2001 Design & Construction 2002 Construction Total	$ 2,500,000 1,200,000 1,766,106 1,800,000 7,266,106	Construction of the 5th floor renovation is scheduled for award in the 1st Quarter of FY 2002. Construction award for major upgrade of plumbing and electrical systems is anticipated in the 4th Quarter, FY 2002. ARS is requesting $7.4 million in FY 2003 to continue to address major facility deficiencies.
Michigan, East Lansing Avian Disease and Oncology Laboratory	1992 Planning 1993 Planning 1998 Planning and Design Total	$ 250,000 212,000 1,800,000 2,262,000	Design for the multi-phase modernization of the facility is scheduled for completion in the 2nd Quarter of FY 2002.

Location and Purpose	Year	Amount of Funds Provided	Description
Minnesota, St. Paul Cereal Disease Laboratory	2002 Design	$ 300,000	Design is fully funded. Design award anticipated in the 2nd Quarter, FY 2002, with completion expected by the 2nd Quarter, FY 2003.
Mississippi, Stoneville Biocontrol and Insect Rearing Facility	1998 Planning and Design	$ 900,000	Design for the replacement facility is complete. The construction of the facility is fully funded. Construction award anticipated by the 4th Quarter of FY 2002.
	1999 Planning and	200,000	
	2000 Construction	2,000,000	
	2001 Construction	4,989,000	
	2002 Construction	8,400,000	
	Total	16,489,000	
Mississippi, Poplarville Horticultural Laboratory for the Gulf Coast	2002 Design	$ 800,000	Design is fully funded. Pre-Design award anticipated by 1st Quarter of FY 2003.
Montana, Miles City Ft. Keogh Livestock and Range Research Laboratory	2000 Planning and Design	$ 530,000	Design and construction for modernization of the existing facilities are fully funded. Design is scheduled for completion by the 2nd Quarter, FY 2002. Construction award is anticipated by the 4th Quarter, FY 2002.
	2001 Construction	5,288,340	
	Total	5,818,340	
Montana, Sidney Northern Plains Agricultural Research Laboratory	1998 Planning and Design	$ 606,000	Design of the new facility is complete. Construction of Phase 1 (Lab/Office Building) of the 2-Phase project is scheduled for completion in the 3rd Quarter, FY 2002.
	1999 Construction	7,300,000	
	Total	7,906,000	

Status of Construction Projects as of December, 2001 (cont'd)

Location and Purpose	Year	Amount of Funds Provided	Description
New Mexico, Las Cruces	1998 Planning and Design	$ 700,000	Design and construction of replacement facility are fully funded. Design for the replacement facility is complete. Construction is scheduled for completion in the 2nd Quarter of FY 2002.
Jornada Experimental Range	1999 Construction	6,700,000	
Management Research	2002 Equipment	475,000	
Laboratory	Total	7,875,000	
New York, Greenport	1993 Design and Construction	$ 2,540,000	Repairs to the Sewage Decontamination Plant and the Waste Water Treatment Plant are in progress. Design of Firehouse/Motorpool is scheduled for completion by the end of the 4th Quarter, FY 2002. Construction award anticipated in FY 2003. $2 million is requested in FY 2003 for continuing modernization of the center.
Plum Island Animal	1994 Construction	1,475,000	
Disease Center	1995 Construction	1,168,000	
	1996 Design and Construction	5,000,000	
	1997 Construction	5,000,000	
	1998 Construction	2,000,000	
	1999 Construction	3,500,000	
	2000 Construction	3,500,000	
	2001 Construction	6,984,600	
	2002 Design and Construction	3,762,000	
	2002 Design (Supplemental)	23,000,000	
	Total	57,929,600	
Oklahoma, Woodward	2002 Planning and Design	$ 1,500,000	Pre-design award anticipated by the 1st Quarter, FY 2003. Design is fully funded.
Southern Plains Range			
Research Station			
Pennsylvania, Wyndmoor	1997 Construction	$ 4,000,000	Modernization of the Center is being accomplished in nine phases, with Phases 1 through 5 already completed. Phase 6 is scheduled for completion in the 2nd Quarter FY 2003. Construction of Phase 7 and design of Phases 8 and 9 are fully funded.
Eastern Regional	1998 Construction	5,000,000	
Research Center	1999 Construction	3,300,000	
	2000 Construction	4,400,000	
	2002 Design and Construction	5,000,000	
	Total	21,700,000	

Status of Construction Projects as of December, 2001 (cont'd)

Location and Purpose	Year	Amount of Funds Provided	Description
South Carolina, Charleston **U.S. Vegetable Laboratory**	1988 Feasibility Study	$ 50,000	Construction of Phase 1 of the replacement facility is scheduled for completion in the 2nd Quarter of FY 2002. $4.5 million appropriated in FY 2002 for items not funded under Phase 1 (headhouse space and fixed equipment). Award for construction of headhouse anticipated by the 4th Quarter, FY 2002.
	1990 Planning and Construction	1,135,000	
	1994 Construction	909,000	
	1995 Construction	5,544,000	
	1996 Construction	3,000,000	
	1997 Construction	3,000,000	
	1998 Construction	4,824,000	
	2000 Construction***	1,000,000	
	2002 Construction	4,500,000	
	Total	23,962,000	
South Dakota, Brookings **Northern Grain Insects Research Laboratory**	2002 Planning and Design	$ 850,000	Design is fully funded. Design award anticipated by the 4th Quarter, FY 2002.
Texas, Weslaco **Subtropical Agricultural Research Laboratory**	1994 Planning	$ 1,400,000	Construction of the laboratory/office building and greenhouses is complete. Other phases of modernization are being undertaken as funds become available.
	1995 Construction	3,009,000	
	1996 Construction	1,000,000	
	1996 Reprogramming	383,000	
	1997 Construction	4,000,000	
	Total	9,792,000	
Utah, Logan **Poisonous Plant Laboratory**	1998 Planning and Design	$ 600,000	Design for new facility is complete. $5.6 million appropriated in FY 2002 to fully fund construction of replacement facility. Construction contract is scheduled for award in the 3rd Quarter of FY 2002.
	1999 Planning and Design	30,000	
	2000 Planning and Design	270,000	
	2001 Construction	4,989,000	
	2002 Construction	5,600,000	
	Total	11,489,000	

***Reprogrammed from Horticultural Crop and Water Management Research Laboratory, Parlier, CA

Status of Construction Projects as of December, 2001 (cont'd)

Location and Purpose	Year	Amount of Funds Provided	Description
West Virginia, Leetown **National Center** for Cool **and Cold Water** Aquaculture **(Broodstock Facility)**	2002 Design and Construction	$ 2,200,000	Design and construction of Broodstock facility is fully funded.
Wisconsin, Madison **Cereal Crops** Research **Laboratory**	2002 Planning, Design Land Acquisition	$ 3,000,000	$3 million appropriated in FY 2002 provides full funding for estimated design costs of $1.1 million and for land purchase.